Appendix 1. Post Market Monitoring of insect protected *Bt* maize MON 810 in Europe – Conclusions of a survey with Farmer Questionnaires in 2011

BioMath

APPLIED STATISTICS AND INFORMATICS
IN LIFE SCIENCES

Post Market Monitoring of insect protected *Bt* maize MON 810[1] in Europe

Biometrical annual Report 2011

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Groß Lüsewitz, July 6, 2012

[1] The commercial name for MON 810 being YieldGard®corn borer maize. YieldGard®corn borer is a registered trademark of Monsanto Technology LLC.

Contents

List of Tables

List of Figures

Summary

Monitoring of a genetically modified organism (GMO) that has been placed on the market is regulated in Annex VII of Directive 2001/18/EC [14]. Monitoring is supposed to confirm that any assumption regarding the occurrence and impact of potential adverse effects of the GMO or its use in the environmental risk assessment (ERA) is correct and to identify any adverse effect of the GMO and its use on human health or the environment which were not anticipated in the ERA. Monsanto has implemented monitoring of *Bt* maize containing event MON 810 through different tools, the main one being a farm questionnaire since 2006.

This biometrical report presents the outcomes of the statistical analysis of the farm questionnaires collected throughout European MON 810 cultivating countries in 2011. The questionnaires have been completed between November 2011 and March 2012. In the 2011 growing season 249 farm questionnaires have been surveyed.

2011 data indicates that in comparison to conventional maize plants, MON 810 plants

- received less insecticides caused by their inherent protection against certain lepidopteran pests,
- had less incidence of stalk/root lodging caused by the inherent protection against certain lepidopteran pests,
- had a longer time to maturity caused by the absence of pest pressure of certain lepidopteran pests,
- gave a higher yield caused by the better fitness of the plant,
- were observed less as volunteers from previous year's planting caused by a more effective previous year's harvest,
- were less susceptible to diseases caused by hardly any insect feeding damage,
- controlled corn borers very well caused by the inherent protection against certain lepidopteran pests, and
- were less susceptible to pests, other than corn borers, especially lepidopteran pests caused by the inherent protection against certain lepidopteran pests and the resulting better fitness of the plants.

Moreover the animals fed with MON 810 performed slightly different compared to those fed with conventional maize. MON 810 fed animals were healthier resulting from a lower incidence of mycotoxins in the feed (due to lower ECB feeding damage on the plant).

The identified deviations have been expected, due to the knowledge of the MON 810 characteristics. The observed significant effects are not adverse. They mostly relate to the increased fitness of MON 810 plants resulting from the inherent protection against certain lepidopteran pests. Overall, the monitoring results substantiate the results from scientific research.

In this year of data collection no adverse effects have been identified by MON 810 cultivating farmers.

Chapter 1

Introduction

According to Annex VII of Directive 2001/18/EC [14] of the European Parliament and of the Council on the deliberate release into the environment of genetically modified plants, the objective of the monitoring is to:

- confirm that any assumption regarding the occurrence and impact of potential adverse effects of the GMO or its use in the environmental risk assessment is correct, and
- identify the occurrence of adverse effects of the GMO or its use on human or animal health, or the environment, which were not anticipated in the environmental risk assessment.

Upon approval of MON 810 (Commission Decision 98/294/EC [13]), Monsanto has established a management strategy in order to minimize the development of insect resistance and offered to inform the Commission and/or the Competent Authorities of the results. These results on insect resistance monitoring, however, are not part of the current report.

The risk assessment for MON 810 showed that the placing on the market of MON 810 poses negligible risk to the environment. Any potential adverse effects of MON 810 on human health and the environment, which were not anticipated in the risk assessment, can be addressed under General Surveillance (GS). An important element of the GS, applied by Monsanto on a voluntary basis, is a farm questionnaire.

The objective of this biometrical report is to present the rationale behind the questionnaire approach and the analysis of the farm questionnaires used with farmers during the 2011 planting season. The questionnaire approach was applied for the first time in 2005. The format of the questionnaire is reviewed on a yearly basis based on the outcome of the latest survey.

Chapter 2

Methodology

2.1 Tool for general surveillance: the farm questionnaire

Structure of the farm questionnaire

Based on commonly defined protection goals, such as soil function, plant health, sustainable agriculture, etc. and derived areas of potential impact on these protection goals, a range of relevant monitoring characters for MON 810 GS have been identified (Table 2.1). These monitoring characters might be influenced by the cultivation of MON 810, but in an agricultural landscape other influencing factors (Table 2.3) exist which need to be taken into account as well, and therefore were also monitored.

For that purpose a farm questionnaire was designed to obtain data on monitoring characters and influencing factors. Any unusual observations observed in monitoring characters would lead to a consideration of the information gathered to determine whether the effect is attributable to changes in influencing factors or the genetic modification (see Appendix B). Farmers record a range of agronomic information, and are the most frequent and consistent observers of crops and fields. For example, they collect field-specific records of seeds, tilling methods, physical and chemical soil analysis, fertilizer application, crop protection measures, yields and quality. Additionally, farmers hold in their "farm files" historical records of their agricultural land and its management. These provide background knowledge and experience that can be used as a baseline for assessing deviations from what is normal for their cultivation areas.

The experimental questionnaire was developed by the German Federal Biological Research Center for Agriculture and Forestry (BBA, now JKI), maize breeders and statisticians in Germany (Wilhelm et al., 2004 [35]). Its questions were simplified to be easily understood by farmers and not to be too burdensome. Also, it had to be sufficiently pragmatic to take into account real commercial situations.

The questionnaire approach was applied for the first time in 2005 and adapted based on that year's experience to create a new version for the 2006 survey. The format of the questionnaire is reviewed on a yearly basis based on the outcome of the latest survey. As appropriate, adjustments are made to improve the statistical relevance of the collected data. In 2009, the questionnaire was also adapted according to DG Environment feedback (13 March 2009) and discussions within EuropaBio (see Appendix B).

The questionnaire is organized around collecting data in four specific areas:

Part 1: Maize grown area

Part 2: Typical agronomic practices to grow maize on your farm

Part 3: Observations of MON 810

Part 4: Implementation of *Bt* maize specific measures

Part 1 records general, basic data on maize cultivation, cultivation area and local pest and disease pressure (independent from GM or non-GM cultivation - background and possible influencing factors). The objectives of **Part 2** are to establish what the normal practices of conventional cultivation are. It therefore establishes a baseline to which information generated in *Bt* areas can be compared. **Part 3** collects data on MON 810 practices and observations.

The aim of the survey is to identify potential adverse effects that might be related to MON 810 plants and their cultivation. For that reason, most questions are formulated to get ordinary data, i.e. with three possible answers ($Plus$/ $As\ usual$/ $Minus$). The $Plus$- and $Minus$-answers indicate a deviation from the situation with conventional maize and are provided with a specification to describe the specific effect and its potential cause. High frequency (> 10 %) of $Plus$ or $Minus$-answers would indicate possible effects (see Section 2.4).

In addition, Monsanto used this questionnaire to check if farmers are in compliance with the MON 810 cultivation recommendations. For that purpose, the answers and free remarks in **Part 4** were evaluated.

Coding of personal data

For confidentiality reasons and for identification, each questionnaire was assigned a unique code where personal data were coded according to the following format:

2	0	1	1	-	0	1	-	M	A	R	-	E	S	-	0	1	-	0	1	-	0	1
year					event code			partner code				country code			interviewer code			farmer code			area code	

Codes:

Event:	01	MON 810
	02	...

Partner:	MON	Monsanto
	MAR	Markin
	AGR	Agro.Ges
	...	...
Country:	ES	Spain
	PT	Portugal
	PL	Poland
	...	...
Interviewer:	01	A
	02	B
	03	...
Farmer:	incremental counter within the interviewer	
Area:	incremental counter within the farmer	

(e.g. 2011-01-MAR-ES-01-01-01). The data were stored and handled in accordance with the Data Protection Directive 95/46/EC [12]. This is in order to ensure an honest response and to avoid competitive intelligence.

Training of the interviewers

To assist the interviewers in filling the questionnaires with the farmers, a 'user´s manual' was developed. While questions have been carefully phrased to obtain accurate observations from farmers, previous experience with the questionnaire may increase awareness and thus result in slightly inconsistent observations from one year to the next.
Additionally, all interviewers have been trained to understand the background of the questions. Here also experience gained during previous years surveys (uncertainties, misinterpretation of questions) could be shared.

2.2 Definition of monitoring characters

The main focus of the questionnaire was the survey of several monitoring characters that were derived from protection goals like soil function, plant health and sustainable agriculture. Table 2.1 provides an overview on the monitored characters and the protection goals that are addressed by them.

Table 2.1: Monitoring characters and corresponding protection goals

Monitoring characters	Protection goals
Time of planting	Sustainable agriculture
Tillage and planting technique	Sustainable agriculture
Insect control practices	Sustainable agriculture
Weed control practices	Sustainable agriculture
Fungal control practices	Sustainable agriculture
Fertilizers application	Sustainable agriculture, soil function
Irrigation practice	Sustainable agriculture
Time of harvest	Sustainable agriculture, plant health
Germination vigor	Plant health
Time to emergence	Plant health
Time to male flowering	Plant health
Plant growth and development	Plant health, soil function
Incidence of stalk/ root lodging	Plant health
Time to maturity	Sustainable agriculture, plant health
Yield	Plant health, soil function
Occurrence of MON 810 volunteers	Sustainable agriculture
Disease susceptibility	Sustainable agriculture, plant health, biodiversity
Insect pest control (Ostrinia nubilalis, Sesamia spp.)	Plant health, sustainable agriculture
Pest susceptibility	Sustainable agriculture, plant health, biodiversity
Weed pressure	Sustainable agriculture, soil function, biodiversity
Occurrence of wildlife (insects, birds, mammals)	Sustainable agriculture, plant health, biodiversity
Performance of fed animals	Animal health
Additional observations	All

Note: only the main corresponding protection goals are listed. However, each of the monitoring characters is addressing most of the protection goals, e.g.: all the characters that concur to demonstrate the agronomic equivalence of MON 810 to conventional maize are addressing impact on biodiversity.

The data for the monitoring characters were surveyed on a qualitative scale by asking farmers for their assessment of the situation compared to conventional cultivation. The farmer is asked to specify the conventional variety(ies) he is cultivating on his farm and probably using as comparator(s). The farmers additionally use their general experience of cultivating conventional maize and especially assessing the seasonal specifics. Farmers normally know if any observed differences are based on i.e. different FAO of the different varieties. For most questions, three possible categories of answers were given: $As\ usual$, $Plus$ (e.g. later, higher, more) or $Minus$ (e.g. earlier, lower or less) (see Table 2.2).

Table 2.2: Monitoring characters and their categories

Monitoring characters - observations of MON 810	$Minus$	$As\ usual$	$Plus$
Time of planting	Earlier	As usual	Later
Tillage and planting technique	-	As usual	Changed
Insect control practices	-	As usual	Changed
Weed control practices	-	As usual	Changed
Fungal control practices	-	As usual	Changed
Fertilizer application	-	As usual	Changed
Irrigation practice	-	As usual	Changed
Time of harvest	Earlier	As usual	Later
Germination vigor	Less	As usual	More
Time to emergence	Accelerated	As usual	Delayed
Time to male flowering	Accelerated	As usual	Delayed
Plant growth and development	Accelerated	As usual	Delayed
Incidence of stalk/root lodging	Less	As usual	More
Time to maturity	Accelerated	As usual	Delayed
Yield	Lower	As usual	Higher
Occurrence of MON 810 volunteers	Less	As usual	More
Disease susceptibility	Less	As usual	More
Insect pest control (Ostrinia nubilalis)	Weak	Good	Very good
Insect pest control (Sesamia spp.)	Weak	Good	Very good
Pest susceptibility	Less	As usual	More
Weed pressure	Less	As usual	More
Occurrence of insects	Less	As usual	More
Occurrence of birds	Less	As usual	More
Occurrence of mammals	Less	As usual	More
Performance of fed animals	-	As usual	Different

2.3 Definition of influencing factors

Additionally, several possible influencing factors were surveyed to assess the local conditions and to determine the cause of potential effects in the monitoring characters (Table 2.3).

Table 2.3: Monitored influencing factors

Type	Factor
Site	Soil characteristics
	Soil quality
	Humus content
Cultivation	Crop rotation
	Soil tillage
	Planting technique
	Weed and pest control practices
	Application of fertilizer
	Irrigation
	Time of sowing
	Time of harvest
Environment	Local pest pressure
	Local disease pressure
	Local occurrence of weeds

2.4 Definition of baselines, effects and statistical test procedure

Normally - if there is no effect of MON 810 cultivation or other influencing factors, and the question being well formulated and unambiguous - one would expect a balanced distribution of the frequencies for the three categories with a predominant part of the farmers assessing the situation to be $As\ usual$ for a certain monitoring character. Small frequencies of differing answers result for example from uncertainty or environmental impacts and are expected to be balanced in both $Minus$ and $Plus$ direction and to run up to approximately 5% (Figure 2.1). Therefore the ***baseline*** for the analysis of monitoring characters with categories $Minus$, $As\ usual$ and $Plus$ is set by a probability pattern 5% - 90% - 5%.

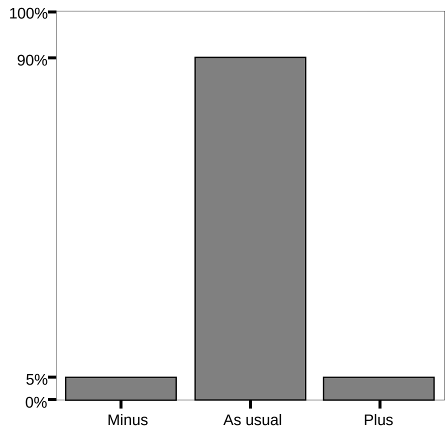

Figure 2.1: Balanced (expected) baseline distribution of the farmers´ answers (no effect)

An effect of the cultivation of MON 810 or any other influencing factor would arise in a greater percentage of $Plus$ or $Minus$ answers, where "greater" or an ***effect***, was quantitatively defined by an increase of at least 5% compared to the baseline. Consequently, a threshold of 10% for the frequencies of $Plus$ (f_{plus}) or $Minus$ (f_{minus}) answers is determined for identifying an effect (Figure 2.2). Graphically, an effect would be expressed by an unbalanced distribution (Figure 2.3 a and b).

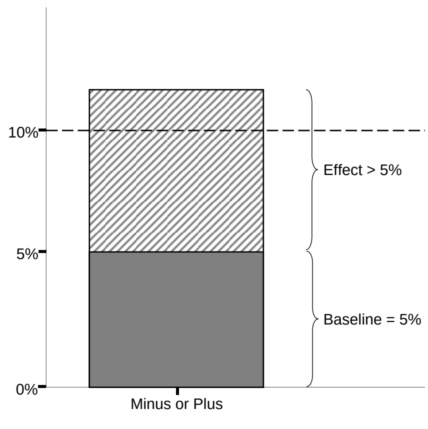

Figure 2.2: Definition of baseline and effect

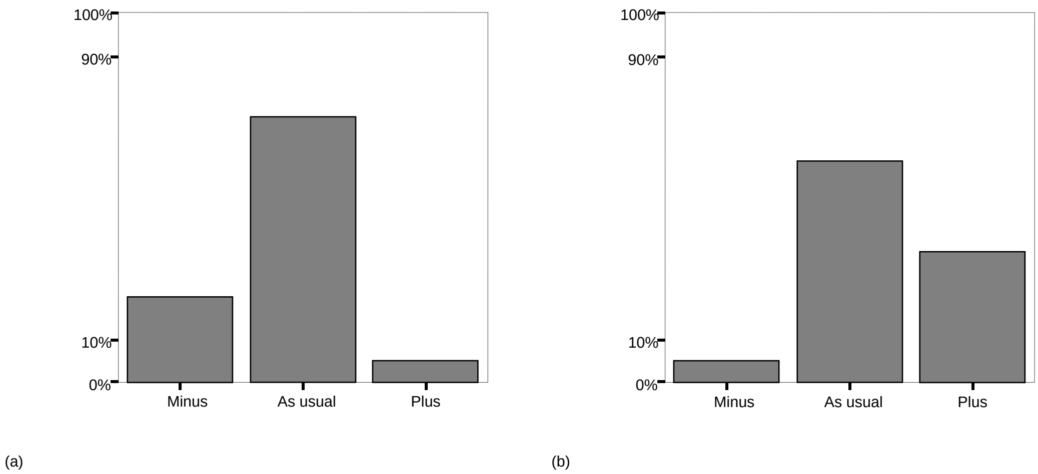

Figure 2.3: Examples for distributions of farmers' answers indicating an effect
(a) $> 10\%$ in category $Minus \rightarrow$ effect, (b) $> 10\%$ in category $Plus \rightarrow$ effect

Therefore, to identify an effect within the data means to test the frequencies of the $Plus$ or $Minus$ answers statistically against the threshold of 10%. The questions on monitoring characters in most cases propose three possible answers. To define TWO categories indicating a difference from $As\ usual$ instead of only ONE category $Different$ is necessary to distinguish between adverse and beneficial effects (the frequency of $Different$ answers would mix up both categories and not help for a risk assessment). A $Plus$ category not necessarily indicates a beneficial effect and a $Minus$ answer doesn't an adverse effect. But both SINGLE categories indicate an effect itself. Both of these $Different$ frequencies are assessed instead of a three-category pattern for adverse effect identification. For holistic illustration the three-category-pattern is pictured. For both directions two independent null hypotheses are formed:

$$H_{0_1} : f_{minus} \geq 0.1 = f_{0_1} \qquad H_{0_2} : f_{plus} \geq 0.1 = f_{0_2}$$
$$H_{A_1} : f_{minus} < 0.1 \qquad H_{A_2} : f_{plus} < 0.1$$

and statistically tested by using the exact binomial test.

Consequently the analysis of each monitoring character is to be performed according to the following scheme:

1. The frequencies of the farmers answers for the three categories are calculated. The calculation of frequencies and their percentages is done both on the basis of all and on the basis of valid answers. When farmers gave no statement, these answers are accounted as missing values and therefore not considered valid. As a consequence, the "valid percentages" state the proportions of the several categories of an answer that are really known, whereas the "percentages" only specify the proportions of the categories within the whole answer spectrum, including no answers. Additionally, the accumulated valid percentages are calculated for illustrating the distribution function and for quality control reasons.

2. The frequencies of $Plus$ and/or $Minus$ answers are statistically tested against the threshold of 10%. The resulting P values are compared to a level of significance $\alpha = 0.01$. If P is less than $\alpha = 0.01$, the null hypothesis ($f_{minus} \geq 10\%$ or $f_{plus} \geq 10\%$) is rejected and thus no effect can be identified. In case of a P value greater than 0.01, the null hypothesis can not be rejected and an effect is indicated. In cases where the estimated frequencies are less than 10% but the corresponding P values greater than $\alpha = 0.01$ (and therefore those frequencies are not significantly less than 10%) the 99% confidence intervals for the frequencies are also calculated to better assess the severity of such test decisions.
3. Where an effect is indicated, the effect must be interpreted (adverse/ beneficial).
4. Where an adverse effect was identified, the cause of the effect was ascertained (MON 810 cultivation, other influencing factors).
5. Identification of adverse effects potentially caused by MON 810 cultivation, would require further examinations. (Such cases, however, have not been found in the 2011 data.)

2.5 Sample size determination and selection

The sample size determination of the survey was based on the statistical tests described above. It depends on the threshold for the test, the error of the first kind α, the error of the second kind β and the effect size d (Rasch et al., 2007 [18]).

The error of the first kind is the probability to reject the null hypothesis although it is true, i.e. to not identifying an existing effect. This probability should be as small as possible since it is the aim of General Surveillance to identify any adverse effects. The error of the first kind is also called consumer´s risk. The error of the second kind is the probability to accept the null hypothesis although it is false, i.e. identifying an effect although no one exists. This probability also should be as small as possible since this means to raise false alarm. The error of the second kind is also called producer´s risk (Table 2.4).

Table 2.4: Error of the first kind α and error of the second kind β for the test decision in testing frequencies of $Plus$ or $Minus$ answers from farm questionnaires against the threshold of 10%

		Real situation	
		$f \geq 10\%$ **indication for an effect**	$f < 10\%$ **no effect**
Test decision	**Acceptance** $H_0 : f \geq 10\%$	Right decision with Probability $1 - \alpha = 99\%$	Wrong decision with Probability $\beta = 1\%$
	Rejection $H_0 : f \geq 10\%$	Wrong decision with Probability $\alpha = 1\%$	Right decision with Probability $1 - \beta = 99\%$ $= POWER$

The magnitude of the effect size d was chosen from experience in analyzing farm questionnaires in a pilot study in Germany 2001 - 2005 [26].

A total sample size of 2500 questionnaires was determined to meet certain accuracy demands (threshold for adverse effects to be tested: 10% of $Minus$ (or $Plus$) answers, error of the first kind: $\alpha = 0.01$, error of the second kind: $\beta = 0.01$, effect size: $d = 3\%$ (CADEMO light [6])) for a survey lasting 10 years (duration of approval). Therefore, the aim is to conduct approximately 250 questionnaires per year.

The selection of farmers for the survey follows European practical conditions. The farmers are selected from public registers (Portugal, Romania) or customer lists of the seed selling companies (Czech Republic, Slovakia, Poland). The public registers do not necessarily contain the contact data of the farms so that it is often very difficult to identify them. The customer lists of the seed selling companies do not completely reflect the MON 810 cultivating farmers, so that some are missing. In Spain there are no lists at all. Here the interviewers identify MON 810 cultivating farmers by knowledge from previous surveys or search in the region. Farmers when buying the seed are informed to possibly be contacted for GS survey. In general, only few farmers refuse to participate.

The cultivation of MON 810 is highly influenced by the Member States (MS), therefore the MS must be taken as the main strata for the selection process. The penetration of the market differs substantially between the MS, so in general two strategies for selecting farmers are applied: in MS with a high rate of market penetration a certain number of farms will be selected whereas in MS with low cultivation rates preferably all MON 810 cultivating farmers are interviewed.

The surveys are performed after the planting season, the farmers are provided with a copy of the questionnaire at least two weeks before a telephone interview or interviewed face-to-face.

In Spain, the largest market, the surveys (150) were performed by Instituto Markin, SL, in Portugal 42 surveys were performed by Agro.Ges - Sociedade de Estudos e Projectos and in Poland the surveys (10) were performed by an independent consultant. These companies have an established experience in agricultural surveys. In the Czech Republic and Slovakia the surveys (32) were performed by the Czech Agriculture University. In Romania (15) Monsanto's field representatives assisted the farmers in filling in the questionnaires.

2.6 Power of the Test

The power of the test $f_{minus} \geq 0.1 = f_{0_1}$ or $f_{plus} \geq 0.1 = f_{0_2}$ is the probability to detect a frequency of $Plus$ or $Minus$ answers not greater than 0.1, where no effect exists. It is defined as $1 - \beta$ ($\beta =$ error of the second kind) and is calculated as followed:

$$Power = \sum_{F=0}^{F_U - 1} \left(\frac{n!}{F!\,(n-F)!} \right) f^F \, (1-f)^{n-F}$$

while:

$F_U = \min\limits_F \left(P\left(F \leq F_E | H_0 \right) > \alpha \right)$

$f =$ given frequency of $Plus$ or $Minus$ answers for which the power is calculated

$F_E =$ absolute frequency of $Plus$ or $Minus$ answers

Given a frequency of 5% of $Plus$ or $Minus$ answers (within the baseline, no effect!), a sample size of $n = 250$ and a probability value $\alpha = 0.01$, no effect will be detected with a power of 73% ($\beta = 0.27$) (Figure 2.4). The power increases for frequency values smaller than 5% and decreases for frequency values greater than 5%.
For a frequency of 10% the power is close to 0, i.e. in case we have an effect the null hypothesis $H_0 : f_{different} \geq 0.1$ will not be rejected and an effect will be recognized for sure. In conclusion, the power of the test as it is currently designed, i.e. to detect no effect where no effect exists during a one year analysis based on 250 questionnaires, is high, but will be increased with the growing sample size over the years, to reduce the producer´s risk (error of the second kind β).

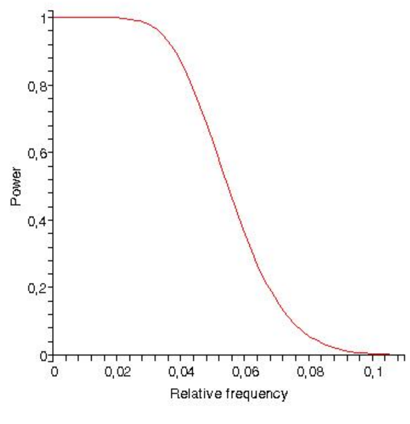

Figure 2.4: Function of the power of the test with a sample size number of 250 and a probability value of $\alpha = 0.01$

2.7 Data management and quality control

A database was developed for data management and storage. For each question a variable was defined by a variable name (eight-digit in maximum) and a variable label (short description of the question). The variables were specified according to their type (qualitative or quantitative), format etc. Missing values were defined (-1: no statement, -2: not readable). For not readable entries in the questionnaires, queries were formulated and the field representatives or farmers were asked for explanation. These entries in the database were corrected. For quantitative variables (e.g. total maize area in ha) the real values from the questionnaire were taken for the database, for qualitative variables the possible parameter values (e.g. Plus/as usual/Minus) were defined and coded (and only the coded values taken).

The database currently contains 1599 cases (questionnaires) for 6 field seasons: 251 for 2006, 291 for 2007, 297 for 2008, 240 for 2009, 271 for 2010 and 249 for 2011.

High quality of the data is assured by training the interviewers initially in a workshop and for refreshment yearly by phone. In face-to-face interviews, the interviewers are instructed to check whether the farmer‘s answer corresponds to their documentation. When surveys are performed by phone, the farmers get the questionnaire about two weeks in advance to pick up the information from their documentation.

All data were entered and controlled for their quality and plausibility.

A quality control check first checks the completeness of the data. Some data fields (especially the monitoring characters or comments in case of farmer‘s assessments differ from $As\ usual$) are defined to be obligatory, therefore missing values or unreadable entries are not accepted. Furthermore the values are checked for correctness (quantitative values within a plausible min-max range, qualitative values meeting only acceptable parameter values). Plausibility control checks the variable values for their contents, both to find incorrect answers and to prove the logical connections between different questions. It also looks for the consistency between $Plus/Minus$-answers and specifications, i.e. whether all these answers were provided with a specification and whether the specifications really substantiated the $Plus/Minus$-answers.

For any missing or implausible data the interviewers are asked to contact the farmers again to complete or correct the questionnaire (interviewers get written queries from BioMath).

Chapter 3

Results

The questionnaires have been completed between November 2011 and February 2012. In the 2011 growing season 249 farm questionnaires have been collected. Ten farmers from the Czech Republic refused to participate in the survey.

Quality and plausibility control confirmed that all 249 questionnaires could be considered for analysis. This good quality also resulted from the interviewer training.

In most cases, the frequencies for the three categories of the monitoring characters show the expected balanced distribution. In some cases, deviations are identified.

An overview of numbers, percentages and levels of significance of the binomial tests of the data in 2011 is given in Table 3.1. The fields highlighted in grey mark the cases for which the test against the 10% threshold resulted in P values greater than 0.01, so the null hypotheses, that these values are greater than 10% could not be rejected, and therefore indicate the occurrence of an effect. Taken together, 2011 data indicates that in comparison to conventional maize plants, MON 810 plants

- received less insecticides,
- had less incidence of stalk/root lodging,
- had a longer time to maturity,
- gave a higher yield,
- were observed less as volunteers from previous year's planting,
- were less susceptible to diseases,
- controlled corn borers very well, and
- were less susceptible to pests other than corn borers, especially lepidopteran pests.

Moreover the animals fed with MON 810 performed slightly different compared to those fed with conventional maize.

In the following sections the detailed analysis of all parameters surveyed using the questionnaire in 2011 is described and the results are assessed scientifically.

Table 3.1: Overview on the results of the descriptive analysis of the monitoring characters in 2011

Monitoring characters[1]	N valid	$Minus^1$	P for $p_0 = 0.1$	$As\ usual^1$	$Plus^1$	P for $p_0 = 0.1$
Crop rotation	249			247 (99.2%)	2 (0.8%)	< 0.01
Time of planting	249	3 (1.2%)	< 0.01	242 (97.2%)	4 (1.6%)	< 0.01
Tillage and planting technique	249			249 (100.0%)	0 (0.0%)	< 0.01
Insect control practices	249			187 (75.1%)	62 (24.9%)	1.0
Weed control practices	249			249 (100.0%)	0 (0.0%)	< 0.01
Fungal control practices	249			249 (100.0%)	0 (0.0%)	< 0.01
Maize Borer control practice	249			192 (77.1%)	57 (22.9%)	1.0
Fertilizer Application	249			249 (100.0%)	0 (0.0%)	< 0.01
Irrigation Practices	249			249 (100.0%)	0 (0.0%)	< 0.01
Time of harvest	249	1 (0.4%)	< 0.01	237 (95.2%)	11 (4.4%)	< 0.01
Germination vigor	249	0 (0.0%)	< 0.01	235 (94.4%)	14 (5.6%)	< 0.01
Time to emergence	249	2 (0.8%)	< 0.01	247 (99.2%)	2 (0.8%)	< 0.01
Time to male flowering	249	0 (0.0%)	< 0.01	244 (98.0%)	5 (2.0%)	< 0.01
Plant growth and development	249	2 (0.8%)	< 0.01	245 (98.4%)	2 (0.8%)	< 0.01
Incidence of stalk / root lodging	249	61 (24.5%)	1.0	188 (75.5%)	0 (0.0%)	< 0.01
Time to maturity	249	0 (0.0%)	< 0.01	217 (87.1%)	32 (12.9%)	0.9415
Yield	249	0 (0.0%)	< 0.01	141 (56.6%)	108 (43.4%)	1.0
Occurrence of volunteers	245	17 (6.9%)	0.627	228(93.1%)	0 (0.0%)	< 0.01
Disease susceptibility	249	49 (19.7%)	1.0	200 (80.3%)	0 (0.0%)	< 0.01
Insect pest control (*Ostrinia nubilalis*)	249	0 (0.0%)	< 0.01	33 (13.4%)	214 (86.6%)	1.0
Insect pest control (*Sesamia* spp.)	193	0 (0.0%)	< 0.01	27 (14.0%)	166 (86.0%)	1.0
Pest susceptibility	249	44 (17.7%)	0.9999	205 (82.3%)	0 (0.0%)	< 0.01
Weed pressure	249	0 (0.0%)	< 0.01	249 (100.0%)	0 (0.0%)	< 0.01
Occurrence of insects	235	2 (0.9%)	< 0.01	232 (98.7%)	1 (0.4%)	< 0.01
Occurrence of birds	239	1 (0.4%)	< 0.01	238 (99.6%)	0 (0.0%)	< 0.01
Occurrence of mammals	237	1 (0.4%)	< 0.01	235 (99.2%)	1 (0.4%)	< 0.01
Performance of animals	38			34 (89.5%)	4 (10.5%)	0.6701

For grey highlighted frequency values the test against the 10% threshold resulted in P values greater than 0.01, so the null hypotheses, that these values are greater than 10% could not be rejected.

[1] Monitoring characters and their categories are defined in section 2.2

3.1 Part 1: Maize grown area

3.1.1 Location

In 2011, 249 questionnaires were surveyed in the cultivation areas of MON 810 in 6 European countries. On average, 9.8% of the total planted MON 810 surfaces were monitored during the 2011 survey (Table 3.2).

Table 3.2: MON 810 cultivation and monitored areas in 2011

Country	Total planted MON 810 surfaces (ha)	Monitored MON 810 surfaces (ha)	Monitored MON 810 surfaces / total planted MON 810 surfaces (%)
Czech Republic	5090	4233	83.2
Poland	3000	253	8.4
Portugal	7723	2277	29.5
Romania	588	553	94.0
Slovakia	761	309	40.6
Spain	97346	3706	3.8
Total	114508	11330	9.9

Figure 3.1 shows a geographical overview on the main cultivation areas of MON 810 in Europe in 2011 (grey areas) and the location of the monitoring sites (numbers).

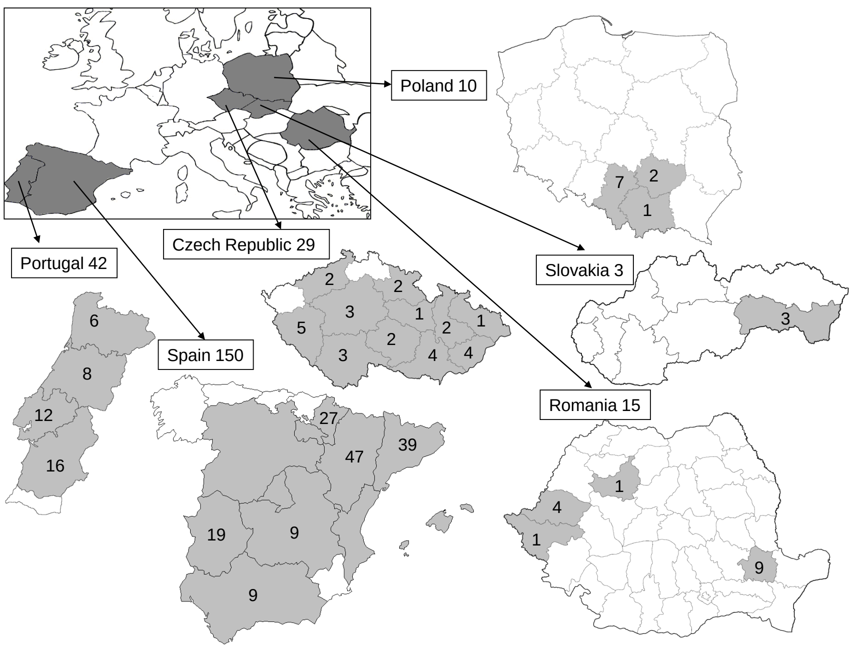

Figure 3.1: Number of sampling sites within the cultivation areas (grey) of MON 810 in Europe in 2011

3.1.2 Surrounding environment

The farmers were asked to describe the land usage in the surrounding of the areas planted with maize. Most of the fields (95.6%) are surrounded by farmland and only a few (3.2%) by forest and wild habitats (Table 3.3, Figure 3.2).

Table 3.3: Land usage in the surrounding of the areas planted with MON 810 in Europe in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	Farmland	238	95.6	95.6	95.6
	Forest or wild habitat	8	3.2	3.2	98.8
	Residential or industrial	0	0.0	0.0	98.8
	Farmland and forest or wild habitat	3	1.2	1.2	100.0
Total		249	100.0	100.0	

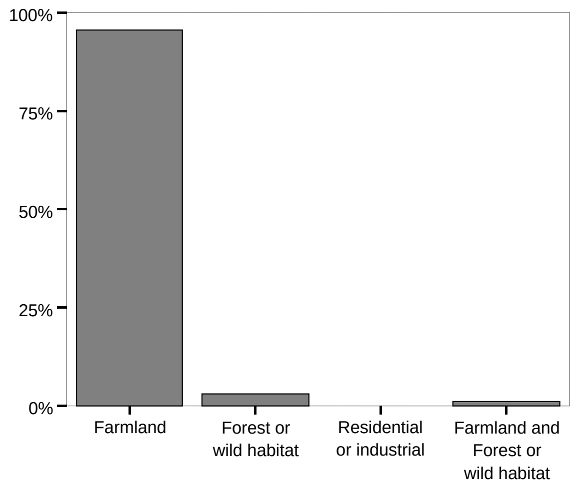

Figure 3.2: Land usage in the surrounding of the areas planted with MON 810 in Europe in 2011

3.1.3 Size and number of fields of the maize cultivated area

The size of the total maize area of the farmers in 2011 ranged from 2.0 to 1700.0 hectares with an overall mean of 109.4 hectares. MON 810 was cultivated in 2011 on 45.3 hectares in average (minimum 1.0; maximum 640.0 hectares). Details for cultivation of maize in 2006, 2007, 2008, 2009, 2010 and 2011 by country can be found in Tables 3.5 and 3.6.

Figure 3.3 shows the mean percentage of MON 810 cultivation area within total maize area per farmer from 2006 to 2011.

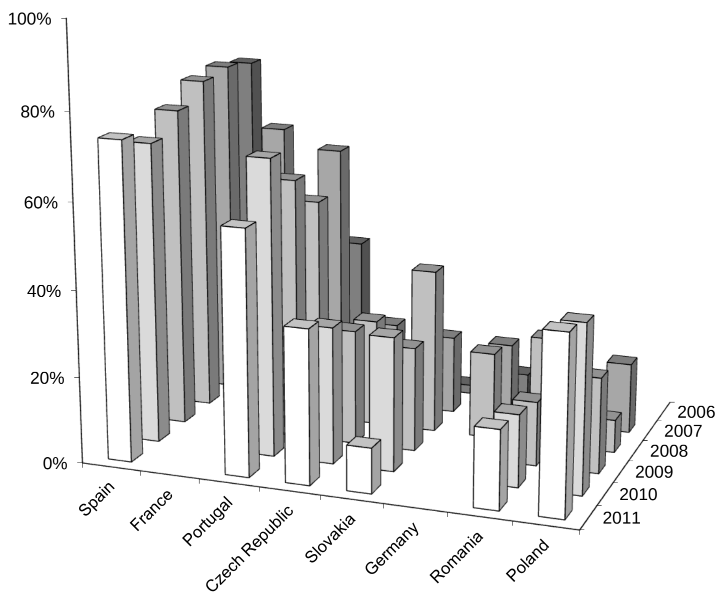

Figure 3.3: Mean percent of MON 810 cultivation area of total maize area per farmer in 2006, 2007, 2008, 2009, 2010 and 2011

In 2011 MON 810 was cultivated on one up to 60 fields per farm. In average every farmer cultivated MON 810 on nearly 5 fields (Table 3.4).

Table 3.4: Number of fields with MON 810 in 2011

Valid N	Mean	Minimum	Maximum	Sum
249	4.63	1	60	1152

Table 3.5: Maize area (ha) per surveyed farmer in 2006, 2007 and 2008

		2006			2007			2008		
Country	Total Area (ha)	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Spain	all maize	26.9	1.0	204.0	31.6	1.0	210.0	31.6	1.5	294.0
	MON 810	21.0	1.0	170.0	25.2	1.0	200.0	24.9	0.5	266.0
France	all maize	80.4	9.6	500.0	54.6	6.0	500.0	-	-	-
	MON 810	18.3	0.4	104.0	35.8	2.0	150.0	-	-	-
Portugal	all maize	100.3	10.0	278.0	89.3	7.0	470.0	78.6	10.0	350.0
	MON 810	35.3	3.0	130.0	54.8	0.8	320.0	41.1	2.5	240.0
Czech Republic	all maize	424.6	52.0	2500.0	433.8	89.3	1400.0	431.9	57.4	3000.0
	MON 810	28.2	1.5	125.0	86.3	19.5	466.0	107.6	10.0	561.1
Slovakia	all maize	491.7	65.0	1300.0	277.2	20.0	659.4	340.2	124.0	637.3
	MON 810	10.0	10.0	10.0	50.6	10.0	174.6	130.1	10.0	400.0
Germany	all maize	274.8	39.0	1110.0	239.5	20.0	1130.0	256.1	4.8	1470.0
	MON 810	17.3	1.0	50.0	43.0	0.5	166.0	51.6	0.2	200.0
Romania	all maize	-	-	-	1969.8	253.0	5616.0	591.4	5.4	6789.0
	MON 810	-	-	-	61.4	0.5	216.0	149.0	2.0	2705.0
Poland	all maize	-	-	-	79.0	20.0	130.0	222.7	4.2	940.0
	MON 810	-	-	-	13.0	11.0	15.0	17.0	4.2	50.0

Table 3.6: Maize area (ha) per surveyed farmer in 2009, 2010 and 2011

		2009			2010			2011		
Country	Total Area (ha)	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Spain	all maize	28.3	3.0	260.0	34.2	2.0	300.0	33.6	2.0	300.0
	MON 810	21.1	2.0	200.0	23.9	1.0	240.0	24.7	2.0	220.0
France	all maize	-	-	-	-	-	-	-	-	-
	MON 810	-	-	-	-	-	-	-	-	-
Portugal	all maize	78.8	8.0	310.0	78.4	9.0	377.0	95.9	10.0	377.0
	MON 810	47.8	1.0	250.0	53.9	1.5	264.0	54.2	2.0	264.0
Czech Republic	all maize	338.9	8.4	789.1	355.7	2.2	2000.0	409.9	45.0	900.0
	MON 810	90.4	6.5	500.0	112.7	2.0	654.0	146.0	20.0	640.0
Slovakia	all maize	546.7	270.0	895.0	594.9	150.0	859.6	986.0	447.6	1700.0
	MON 810	132.3	50.0	285.0	184.2	60.0	400.7	103.0	48.1	140.8
Germany	all maize	-	-	-	-	-	-	-	-	-
	MON 810	-	-	-	-	-	-	-	-	-
Romania	all maize	417.5	2.5	6869.0	196.9	20.0	1100.0	180.3	65.0	700.0
	MON 810	62.1	1.0	1114.0	32.9	0.1	284.0	32.8	2.5	99.0
Poland	all maize	58.0	39.0	95.0	61.1	19.0	150.0	61.8	10.0	180.0
	MON 810	12.8	5.5	25.0	23.8	1.5	100.0	25.3	1.0	130.0

3.1.4 Maize varieties grown

The farmers were asked to list up to five MON 810 varieties and up to five conventional maize varieties that they cultivated in 2011 on their farm. 53 different MON 810 varieties and 154 different conventional maize varieties were listed. The most named varieties (at least 6 times) and the frequencies are listed in Table 3.7.

Table 3.7: Names of most cultivated MON 810 and conventional maize varieties in 2011

MON 810 maize		Conventional maize	
Variety	Frequency	Variety	Frequency
PR 33 Y 72	53	DKC 6666	40
DKC 6667 YG	50	PR 32 T 83	24
PR 34 N 44	34	PR 34 N 43	18
PR 33 P 67	24	DKC 3511	17
PR 31 N 28	19	PR 33 Y 74	17
PR 32 T 86	19	Sancia	16
PR 34 P 86	15	PR 32 T 16	12
DKC 3512 YG	14	DKC 5276	11
PR 33 W 86	14	Ronaldinio	10
Beles Sur	12	DK 440	8
DKC 2961 YG	12	Carella	7
DKC 5784 YG	12	DKC 5542	7
DKC 6041 YG	12	Helen	7
PR 32 G 49	12	NK FACTOR	7
DKC 5277 YG	10	PR 32 W 86	7
PR 33 D 48	10	DKC 4490	6
PR 35 Y 69	10	ELEONORA	6
DKC 3946 YG	9	PR 33 A 46	6
DKC 4442 YG	9	PR 34 P 88	6
Carella YG	8	PR 34 Y 02	6
Helen BT	8	PR 39 F 58	6
Kuratus	7		
Antiss YG	6		
Kvalitas YG	6		

3.1.5 Soil characteristics of the maize grown area

To assess the possible influence of the soil on monitoring characters data on soil characteristics, quality and carbon content were surveyed. Table 3.8 summarizes the reported soil types of the maize grown area.

Table 3.8: Predominant soil type of maize grown area in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	very fine (clay)	7	2.8	2.8	2.8
	fine (clay, sandy clay, silty clay)	52	20.9	20.9	23.7
	medium (sandy clay loam. clay loam. sandy silt)	77	30.9	30.9	54.6
	medium-fine (silty clay loam, silt loam)	40	16.1	16.1	70.7
	coarse (sand, loamy sand, sandy loam)	28	11.2	11.2	81.9
	no predominant soil type (different soil types)	45	18.1	18.1	100.0
	I do not know	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Farmers responses regarding the quality of the soil of the area grown with maize are given in Table 3.9 and Figure 3.4. 96.0% (239/249) of the maize was grown on normal or good soil according to the response of the farmers. The highest percentages of poor soil quality were found in Poland (10.0%, 1/10) and Portugal (9.5%, 4/42).

Table 3.9: Soil quality of the maize grown area as assessed by the farmers in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	above average - good	101	40.6	40.6	40.6
	average - normal	138	55.4	55.4	96.0
	below average - poor	10	4.0	4.0	100.0
Total		249	100.0	100.0	

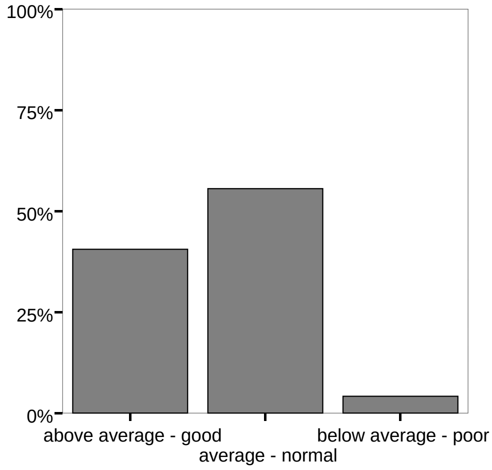

Figure 3.4: Soil quality of the maize grown area as assessed by the farmers in 2011

84 farmers were able to specify the humus content (not a commonly known measure all over Europe), which ranged from 0.58 to 7.27% with a mean of 2.2% (Table 3.10). 165 farmers did not specify the humus content: 90.0% (9/10) of the Polish, 84.7% (127/150) of the Spanish, 79.3% (23/29) of the Czech, 40.0% (6/15) of the Romanian, 0.0% (0/42) of the Portuguese and 0.0% (0/3) of the Slovak farmers.

Table 3.10: Humus content (%) in 2011

Valid N	Mean	Minimum	Maximum	Missing N
84	2.2	0.58	7.27	165

3.1.6 Local disease, pest and weed pressure in maize

Data of local disease, pest and weed pressure in maize are collected to find out if these environmental data have any influence on the values of the monitoring characters. These data differ from year to year and depend on the cultivation area and reflect the assessment of the farmer.

Local disease pressure as assessed by the farmers

The local disease pressure (fungal, viral) in maize was assessed to be low or as usual by 96.8% (241/249) of the farmers (Table 3.11, Figure 3.5). From the 129 farmers who assessed the pressure to be low, 68.2% (88/129) came from Spain and 16.3% (21/129) came from Portugal. 3.2% (8/249) stated the local disease pressure as high, where 50.0% (4/8) of them came from Spain and 50.0% (4/8) from Portugal.

Table 3.11: Farmers assessment of the local disease pressure (fungal, viral) in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	low	129	51.8	51.8	51.8
	as usual	112	45.0	45.0	96.8
	high	8	3.2	3.2	100.0
Total		249	100.0	100.0	

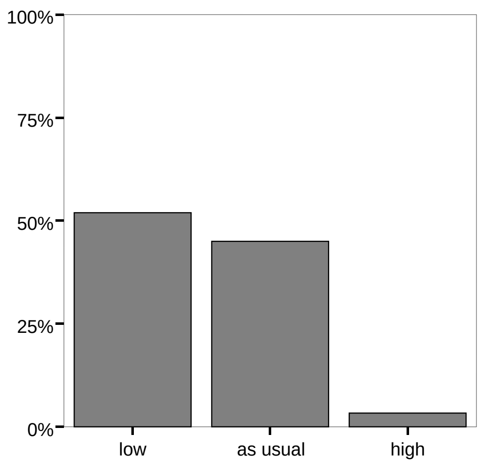

Figure 3.5: Farmers assessment of the local disease pressure (fungal, viral) in 2011

Local pest pressure as assessed by the farmers

Regarding the local pest pressure (insects, mites, nematodes), 95.2% (237/249) of the farmers evaluated it to be low or as usual and 4.8% (12/249) evaluated it to be high (Table 3.12, Figure 3.6). 79.5% (97/122) of the farmers assessing low pest pressure came from Spain, 66.7% (8/12) of the farmers with high pest pressure came also from Spain.

Table 3.12: Farmers assessment of the local pest pressure (insects, mites, nematodes) in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	low	122	49.0	49.0	49.0
	as usual	115	46.2	46.2	95.2
	high	12	4.8	4.8	100.0
Total		249	100.0	100.0	

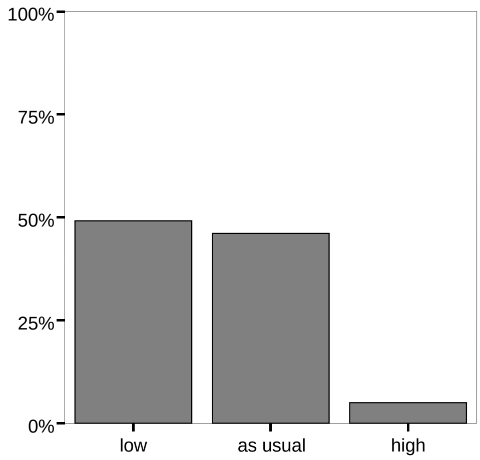

Figure 3.6: Farmers assessment of the local pest pressure (insects, mites, nematodes) in 2011

Local weed pressure as assessed by the farmers

84.7% (211/249) assessed the local weed pressure to be low or as usual and 15.3% (38/249) evaluated it to be high (Table 3.13, Figure 3.7). 88.7% (55/62) of the farmers with low weed pressure came from Spain. 55.3% (21/38) who evaluated it to be high came from Portugal.

Table 3.13: Farmers assessment of the local weed pressure in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	low	62	24.9	24.9	24.9
	as usual	149	59.8	59.8	84.7
	high	38	15.3	15.3	100.0
Total		249	100.0	100.0	

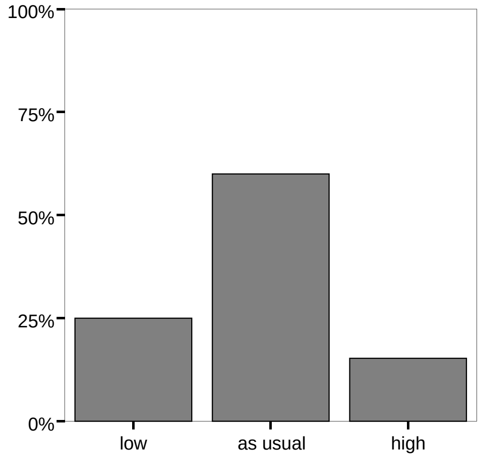

Figure 3.7: Farmers assessment of the local weed pressure in 2011

3.2 Part 2: Typical agronomic practices to grow maize

3.2.1 Irrigation of maize grown area

80.3% (200/249) irrigated their fields (Table 3.14): 100% (150/150) of the Spanish, 100% of the Portuguese (42/42) and 4.0% (8/15) of the Romanian farmers. In Czech Republic, Slovakia and Poland the farmers did not irrigate their maize grown area. The irrigation of the maize grown area is a productivity factor. These data reflect the general practices in Europe. The irrigation depends on the weather conditions, even though it could be relevant for the analysis of GM maize specific effects.

Table 3.14: Irrigation of maize grown area in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	200	80.3	80.3	80.3
	no	49	19.7	19.7	100.0
Total		249	100.0	100.0	

The most of the irrigating farmers (33.7%) used Sprinkler followed by Gravity (29.3%) and Pivot (13.7%). Some of them used more than one of the named or other types of irrigation (Table 3.15).

Table 3.15: Type of irrigation in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	Gravity	73	29.3	36.5	36.5
	Sprinkler	84	33.7	42.0	78.5
	Pivot	34	13.7	17.0	95.5
	other	5	2.0	2.5	98.0
	Gravity and other	1	0.4	0.5	98.5
	Sprinkler and other	3	1.2	1.5	100.0
Total		200	100.0		

3.2.2 Major rotation of maize grown area

The main crop rotation within three years is maize-maize-maize followed by cereals-cereals-maize, maize-cereals-maize and cereals-maize-maize. Some other crop rotations were mentioned, but all with low occurrence (Table 3.16). The group of Legumes contains peas, beans, vetch (Vicia) and Lucerne (Alfalfa).

Table 3.16: Major rotation of maize grown area before 2011 planting season (two years ago and previous year) sorted by frequency

	two years ago	previous year	Frequency	Percent	Valid percentages	Accumulated percentages
Valid	maize	maize	89	35.7	35.7	35.7
	cereals	cereals	36	14.5	14.5	50.2
	maize	cereals	29	11.6	11.6	61.8
	cereals	maize	23	9.2	9.2	71.1
	legumes	legumes	18	7.2	7.2	78.3
	oil plants	cereals	13	5.2	5.2	83.5
	maize	cotton	5	2.0	2.0	85.5
	vegetables	cereals	5	2.0	2.0	87.6
	legumes	cereals	4	1.6	1.6	89.2
	legumes	maize	4	1.6	1.6	90.8
	maize	vegetables	3	1.2	1.2	92.0
	vegetables	vegetables	3	1.2	1.2	93.2
	cereals	legumes	2	0.8	0.8	94.0
	no cultivation	maize	2	0.8	0.8	94.8
	vegetables	maize	2	0.8	0.8	95.6
	cereals	no cultivation	1	0.4	0.4	96.0
	cereals	oil plants	1	0.4	0.4	96.4
	cotton	no cultivation	1	0.4	0.4	96.8
	cotton	vegetables	1	0.4	0.4	97.2
	maize	legumes	1	0.4	0.4	97.6
	no cultivation	cereals	1	0.4	0.4	98.0
	no cultivation	no cultivation	1	0.4	0.4	98.4
	oil plants	no cultivation	1	0.4	0.4	98.8
	oil plants	oil plants	1	0.4	0.4	99.2
	oil plants	vegetables	1	0.4	0.4	99.6
	vegetables	oil plants	1	0.4	0.4	100.0
Total			249	100.0	100.0	

3.2.3 Soil tillage practices

The farmers were asked to answer whether they performed soil tillage. 97.2% (242/249) said "yes" (Table 3.17) while 2.8% answered "no". Five farmers who answered "no" (71.4%) came from Spain, two (28.6%) from Poland.

Table 3.17: Soil tillage practices in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	242	97.2	97.2	97.2
	no	7	2.8	2.8	100.0
Total		249	100.0	100.0	

All farmers who said "yes" specified the time of tillage. 72.7% (176/242) performed it in Winter, 21.6% (58/268) in Spring and 4.9% (13/268) in Winter and Spring (Table 3.18, Figure 3.8).

Table 3.18: Time of tillage in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	Winter	176	72.7	72.7	72.7
	Spring	59	24.4	24.4	97.1
	Winter and Spring	7	2.9	2.9	100.0
Total		242	100.0	100.0	

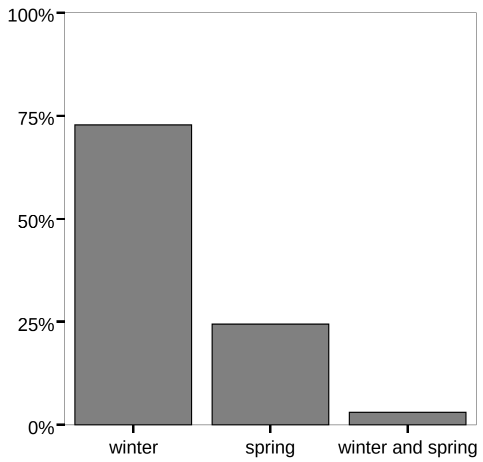

Figure 3.8: Time of tillage in 2011

3.2.4 Maize planting technique

79.9% (199/249) of the farmers used conventional maize planting techniques, 14.1% (35/249) mulch and 4.0% (10/249) used direct sowing. Five of the farmers used two different or all three of the above mentioned maize planting techniques on different fields (Table 3.19, Figure 3.9).

Table 3.19: Maize planting technique in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	conventional planting	199	79.9	79.9	79.9
	mulch sowing	35	14.1	14.1	94.0
	direct sowing	10	4.0	4.0	98.0
	conventional planting + mulch sowing	3	1.2	1.2	99.2
	mulch + direct sowing	1	0.4	0.4	99.6
	all three	1	0.4	0.4	100.0
Total		249	100.0	100.0	

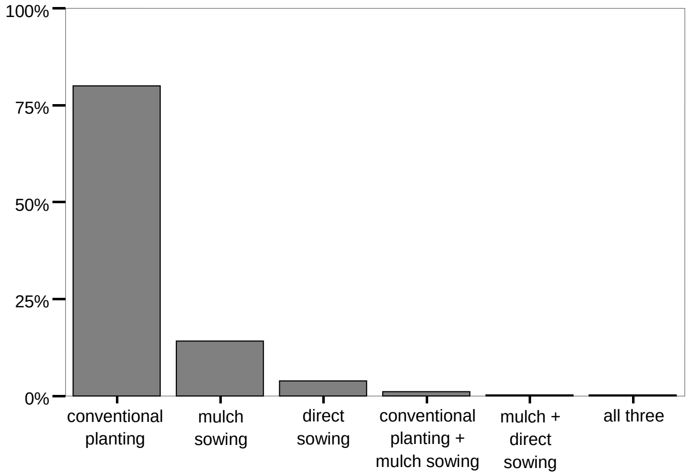

Figure 3.9: Maize planting technique in 2011

3.2.5 Typical weed and pest control practices in maize

Farmers were asked to specify the typical weed and pest control practices in maize at their farms. In conventional maize 81.9% of all farmers (204/249) used insecticides and 27.9% (57/204) of them used also insecticides against corn borers . No farmer used biocontrol treatments, all of them (100.0%, 249/249) used herbicides, 13.7% (34/249) used mechanical weed control and 15.7% (39/249) used fungicides (Table 3.20) in conventional maize.

Table 3.20: Typical weed and pest control practices in maize in 2011

Insecticide(s)		Frequency	Percent
	yes	204	81.9
	no	45	18.1
Total		249	100.0
Insecticide(s) against corn borers		Frequency	Percent
	yes	57	27.9
	no	147	72.1
Total		204	100.0
Use of biocontrol treatments		Frequency	Percent
	yes	0	0.0
	no	249	100.0
Total		249	100.0
Herbicide(s)		Frequency	Percent
	yes	249	100.0
	no	0	0.0
Total		249	100.0
Mechanical weed control		Frequency	Percent
	yes	34	13.7
	no	215	86.3
Total		249	100.0
Fungicide(s)		Frequency	Percent
	yes	39	15.7
	no	210	84.3
Total		249	100.0

3.2.6 Application of fertilizer to maize grown area

All farmers (100%, 249/249) applied fertilizer to the maize grown area (Table 3.21).

Table 3.21: Application of fertilizer to maize grown area in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	249	100.0	100.0	100.0
	no	0	0.0	0.0	100.0
Total		249	100.0	100.0	

3.2.7 Typical time of maize sowing

For quality control and to see if the collected data are plausible the farmers were asked about the typical time of maize sowing. The time of sowing ranged from 1 March 2011 to 30 June 2011 (Table 3.22).

Table 3.22: Typical time of maize sowing in 2011

	Earliest date	Latest date	Mean	Valid N
Sowing from	01.03.11	08.06.11	11.04.11	249
Sowing till	15.03.11	30.06.11	30.04.11	249

3.2.8 Typical time of maize harvest

The question on the typical time of harvest was also asked for quality control and to see if the collected data are within a plausible range. The time of harvest for maize grain ranged from 1 August 2011 to 31 December 2011 and for maize forage from 1 August 2011 to 30 December 2011 (Table 3.23).

Table 3.23: Typical time of maize harvest in 2011

	Earliest date	Latest date	Mean	Valid N
Harvest grain maize from	01.08.11	01.12.11	05.10.11	228
Harvest grain maize till	30.08.11	31.12.11	29.10.11	228
Harvest forage maize from	01.08.11	15.12.11	11.09.11	55
Harvest forage maize till	10.08.11	30.12.11	02.10.11	55

3.3 Part 3: Observations of MON 810

3.3.1 Agricultural practices in MON 810 (compared to conventional maize)

Crop rotation

The crop rotation for MON 810 was specified to be as usual in 99.2% (247/249) of the cases (Table 3.24). The 2 farmers who changed their crop rotation came from Czech Republic and explained that they sow maize instead of cereals as forecrop. All explanations are listed in Appendix A, in Table A.1.

Table 3.24: Crop rotation for MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	as usual	247	99.2	99.2	99.2
	changed	2	0.8	0.8	100.0
Total		249	100.0	100.0	

The valid percentage of changed crop rotation (0.8%) is significantly less than 10% since the resulting P value is less than the level of significance $\alpha = 0.01$ (Table 3.25). Therefore, the null hypothesis $f_{changed} \geq 0.1$ is rejected with a power of 99.9% and no effect on crop rotation is indicated.

Table 3.25: Results of the binomial test for changed crop rotation for MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249			247 (99.2%)	2 (0.8%)	< 0.01

Planting time

The planting time of MON 810 was specified to be as usual compared to conventional maize by 97.2% (242/249) of the farmers (Table 3.26, Figure 3.10).

Table 3.26: Planting time of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	earlier	3	1.2	1.2	1.2
	as usual	242	97.2	97.2	98.4
	later	4	1.6	1.6	100.0
Total		249	100.0	100.0	

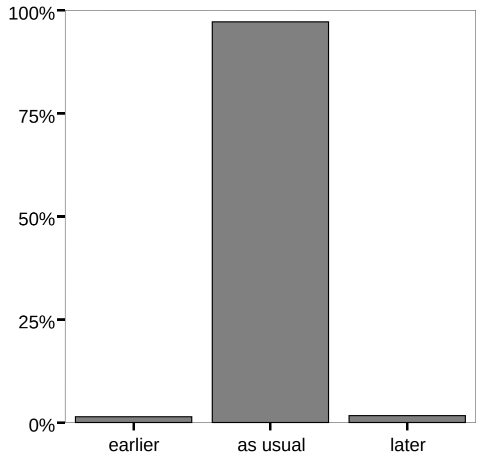

Figure 3.10: Planting time of MON 810 compared to conventional maize in 2011

Both the valid percentage of earlier planting (1.2%) and the valid percentage of later planting (1.6%) are significantly less than 10% since the resulting P values are less than the level of significance $\alpha = 0.01$ (Table 3.27). Therefore, both null hypotheses $f_{earlier} \geq 0.1$ and $f_{later} \geq 0.1$ are rejected with a power of 99.9% and no effect on time of planting is indicated.

Table 3.27: Results of the binomial test for different planting time for MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	3 (1.2%)	< 0.01	242 (97.2%)	4 (1.6%)	< 0.01

For completeness, although no effect is identified, the main reasons for earlier and later planting of MON 810 are reflected in Table 3.28 and individual specifications for earlier or later planting of MON 810 are given in Appendix A, Table A.2. Again as in the previous years, the farmers essentially mentioned a higher flexibility in the handling because of the lower susceptibility of MON 810 to corn borers and the resulting fitness of the plant and the weather conditions as reasons for earlier or later planting.

Table 3.28: Reasons for different planting time of MON 810 compared to conventional maize in 2011

		Reasons			Total
		variety	flexibility	weather	
Valid	earlier	1	2	0	3
	later	1	2	1	4
Total		2	4	1	7

Tillage and planting techniques

No farmer changed the tillage and planting technique of MON 810 compared to that used in conventional maize, as reflected in Table 3.29.

Table 3.29: Tillage and planting techniques for MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	as usual	249	100.0	100.0	100.0
	changed	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Insect and corn borer control practices

Insecticides applied in MON 810 sorted by their regulatory approval as seed treatment, spray application or microgranules are listed per country in Appendix A, Table A.3. MON 810 received insecticide treatments mainly through seed coatings. Clothianidin, Imidachloprid, Thiametoxam and Fipronil were used for that purpose. Lambda-Cyhalothrin is the most used active ingredient for spraying. Chlorpyrifos is registered for use as granules and spray, but was used mostly as granules.

All farmers were asked to describe their insect control practices in MON 810 compared to conventional maize in 2011. 75.1% (187/249) specified no change in practices, while 24.9% (62/249) used a different program (Table 3.30).

Table 3.30: Use of insect control in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	similar	187	75.1	75.1	75.1
	different	62	24.9	24.9	100.0
Total		249	100.0	100.0	

The valid percentage of different insect control practices (24.9%) is greater than 10%. The resulting P value is greater than the level of significance $\alpha = 0.01$ (Table 3.31). The null hypothesis $f_{different} \geq 0.1$ is therefore not to reject - an effect on the insect control program is indicated.

Table 3.31: Results of the binomial test for different insect control practices in MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249			187 (75.1%)	62 (24.9%)	1.0

The difference arises from farmers using less insecticide applications in general (Table 3.32) as well as from farmers not controlling corn borers any more with conventional insecticide applications (Table 3.33). The farmer that changed his insecticide practice although he did not use insecticides in conventional maize explained, that he made "no seed treatment in conventional maize". All individual explanations are given in Appendix A, Table A.4.

Table 3.32: Insect control practices compared to conventional maize in the context of the general use of insecticides in 2011

		Insect control practices in MON 810		
		similar	different	Total
Do you usually use insecticides? (section 3.2.5)	Yes	143	61	204
	No	44	1	45
Total		187	62	249

Table 3.33: Corn Borer control practices compared to conventional maize in the context of the general use of insecticides against Corn Borer in 2011

		Corn borer control practices in MON 810		
		similar	different	Total
Do you usually use insecticides against corn borer? (section 3.2.5)	Yes	0	57	57
	No	147	0	147
Total		147	57	204

The reduced use of conventional insecticides to control corn borers can be anticipated, since MON 810 is specifically designed to control corn borers as *Ostrinia nubilalis* and *Sesamia* spp. Therefore, planting of MON 810 makes insecticide applications for this purpose obsolete.

The difference in the use of general insecticide applications (less was used on MON 810 fields) was reported by farmers as the reduced need for general insecticide treatments in MON 810 fields. This could be explained by the fact that, compared with conventional maize, MON 810 is also less susceptible to Lepidopteran pests other than *Ostrinia nubilalis* and *Sesamia* spp. as described in section 3.3.5. This would reduce also the need for more general insecticide applications.

Weed control practices

The herbicides applied in MON 810 fields are listed in Appendix A, Table A.5. A wide number of herbicides and actives were used. The main actives of herbicides that were cited by the farmers are:

- Acetochlor
- Terbutilazin
- Nicosulfuron
- Mesotrion
- S-Metolachlor
- Atrazin
- Fluroxypyr
- Glyphosat
- Dicamba
- Isoxaflutol

These all are well-known products used for weed control in maize.

The farmers were asked to describe their weed control practices in MON 810 in 2011 compared to conventional maize. No farmer used a different weed control in MON 810 compared to conventional maize (Table 3.34).

Table 3.34: Use of weed control in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	similar	249	100.0	100.0	100.0
	different	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Fungal control practices

Fungicides are generally not applied in maize, but all maize usually receives a fungicide seed treatment. In the 2011 survey, as reported in section 3.2.5, 15.7% (39/249) of the farmers stated that fungicides were used for seed treatment in maize, and in some cases they could gave information on what kind of fungicide was used. The actives of fungicides that were cited by the farmers are:

- Fludioxynil
- Mefenoxam
- Metalaxyl M
- Thiamethoxam

All named fungicides are commonly used for treatment of maize seed.

No farmer did change the fungicide program of MON 810 compared to that of conventional maize (Table 3.35).

Table 3.35: Use of fungicides on MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	similar	249	100.0	100.0	100.0
	different	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Fertilizer application practice

All farmers answered the question regarding the fertilizer application in MON 810. No farmer used a different program (Table 3.36).

Table 3.36: Fertilizer application practice in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	similar	249	100.0	100.0	100.0
	changed	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Irrigation practice

All farmers answered the question regarding the irrigation practice in MON 810, no farmer changed the practice (Table 3.37).

Table 3.37: Irrigation practice in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	similar	249	100.0	100.0	100.0
	changed	0	0.0	0.0	100.0
Total		249	100.0	100.0	

Harvest of MON 810

The farmers were asked if they harvested MON 810 earlier or later than conventional maize or as usual. 0.4% (1/249) of the farmers stated that they harvested MON 810 earlier compared to conventional maize, 4.4% (11/249) stated that they harvested MON 810 later (Table 3.38, Figure 3.11).

Table 3.38: Harvest of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	earlier	1	0.4	0.4	0.4
	as usual	237	95.2	95.2	95.6
	later	11	4.4	4.4	100.0
Total		249	100.0	100.0	

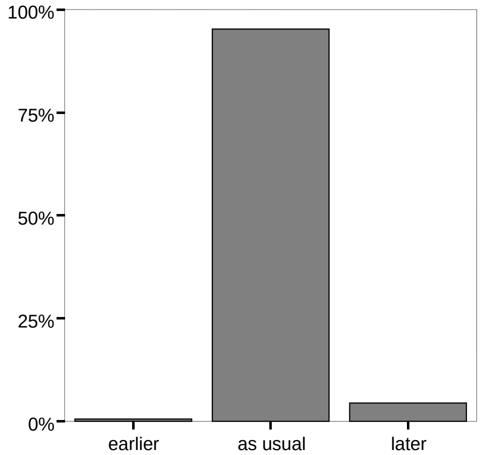

Figure 3.11: Harvest of MON 810 compared to conventional maize in 2011

The valid percentage of earlier harvest (0.4%) and later harvest (4.4%) do not exceed the 10% threshold and the resulting P values are not greater than the level of significance $\alpha = 0.01$ (Table 3.39) and therefore, the corresponding null hypotheses could be rejected, for $f_{earlier} \geq 0.1$ with a power of 99.9% and for $f_{later} \geq 0.1$ with a power of 85.9%. No effect on the harvest time of MON 810 is indicated.

Table 3.39: Results of the binomial tests for different harvesting time of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	1 (0.4%)	< 0.01	237 (95.2%)	11 (4.4%)	< 0.01

The full individual feedback of the farmers for different harvesting time is given in Appendix A, Table A.6.

Assessment of differences in agricultural practices in MON 810 (compared to conventional maize)

Agricultural practices in MON 810 (compared to conventional maize), were not changed with regard to crop rotation, planting time, tillage and planting techniques, weed control, fungal control, fertilizer application, irrigation and harvest time of MON 810. Differences exist in the aspects: Insect and corn borer control of MON 810.

The difference in insect and corn borer control arises from farmers not controlling corn borers any more with conventional insecticide applications, because MON 810 is specifically designed to control corn borers as *Ostrinia nubilalis* and *Sesamia* spp. Furthermore, less insecticides were used in general since MON 810 is also less susceptible to several Lepidopteran pests other than *Ostrinia nubilalis* and *Sesamia* spp.

3.3.2 Characteristics of MON 810 in the field (compared to conventional maize)

Germination vigor

5.6% (14/249) of all farmers assessed the germination of MON 810 to be more vigorous, no farmer assessed it to be less vigorous (Table 3.40, Figure 3.12).

Table 3.40: Germination of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less vigorous	0	0.0	0.0	0.0
	as usual	235	94.4	94.4	94.4
	more vigourous	14	5.6	5.6	100.0
Total		249	100.0	100.0	

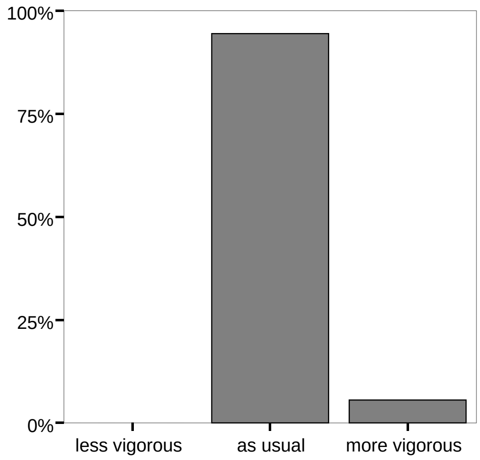

Figure 3.12: Germination of MON 810 compared to conventional maize in 2011

The valid percentages of less and more vigorous germination do not exceed the 10% threshold. The P values for both do not exceed the level of significance $\alpha = 0.01$, i.e. both null hypotheses could be rejected with a power of 99.9% for $f_{less\ vigorous} \geq 0.1$ and 57.0% for $f_{more\ vigourous} \geq 0.1$ (Table 3.41) and no effect on the germination vigor is indicated. Individual explanations for the observations of the farmers are given in Appendix A, Table A.7.

Table 3.41: Results of the binomial tests for different germination vigor of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	0 (0.0%)	< 0.01	235 (94.4%)	14 (5.6%)	< 0.01

Time to emergence

0.8% (2/249) of the farmers assessed the time to emergence to be accelerated for MON 810, while no farmer (0.0%, 0/249) indicated the time to emergence to be delayed (Table 3.42, Figure 3.13).

Table 3.42: Time to emergence of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	accelerated	2	0.8	0.8	0.8
	as usual	247	99.2	99.2	100.0
	delayed	0	0.0	0.0	100.0
Total		249	100.0	100.0	

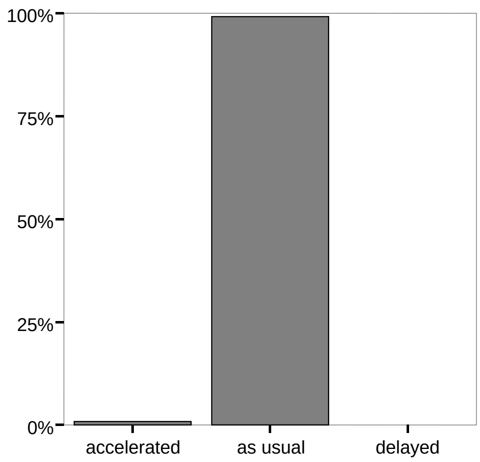

Figure 3.13: Time to emergence of MON 810 compared to conventional maize in 2011

Valid percentages for both accelerated and delayed time to emergence do not exceed the 10% threshold. The resulting P values are less than the level of significance $\alpha = 0.01$ for both null hypotheses (Table 3.43), so they could be rejected with a power of 99.9% for $f_{accelerated} \geq 0.1$ and $f_{delayed} \geq 0.1$ and no effect is indicated. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.43: Results of the binomial tests for different time to emergence of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	2 (0.8%)	< 0.01	247 (99.2%)	0 (0.0%)	< 0.01

Time to male flowering

Time to male flowering was assessed to be as usual in 98.0% (244/249) of all cases (Table 3.44, Figure 3.14).

Table 3.44: Time to male flowering of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	accelerated	0	0.0	0.0	0.0
	as usual	244	98.0	98.0	98.0
	delayed	5	2.0	2.0	100.0
Total		249	100.0	100.0	

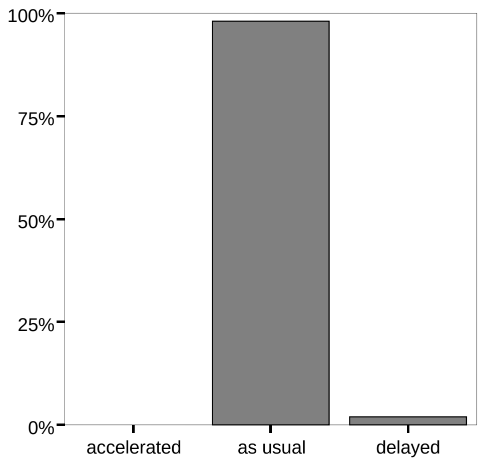

Figure 3.14: Time to male flowering of MON 810 compared to conventional maize in 2011

Neither the valid percentage of accelerated time to male flowering (0.0%), nor the valid percentage of delayed time to male flowering (2.0%) exceed the 10% threshold and the resulting P values are less than the level of significance $\alpha = 0.01$ (Table 3.45). The null hypotheses $f_{accelerated} \geq 0.1$ and $f_{delayed} \geq 0.1$ could be rejected with a power of 99.9%. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.45: Results of the binomial tests for different time to male flowering of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	0 (0.0%)	< 0.01	244 (98.0%)	5 (2.0%)	< 0.01

Plant growth and development

Plant growth and development was accelerated in 0.8% (2/249) and delayed in 0.8% (2/249) of the all cases (Table 3.46, Figure 3.15).

Table 3.46: Plant growth and development of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	accelerated	2	0.8	0.8	0.8
	as usual	245	98.4	98.4	99.2
	delayed	2	0.8	0.8	100.0
Total		249	100.0	100.0	

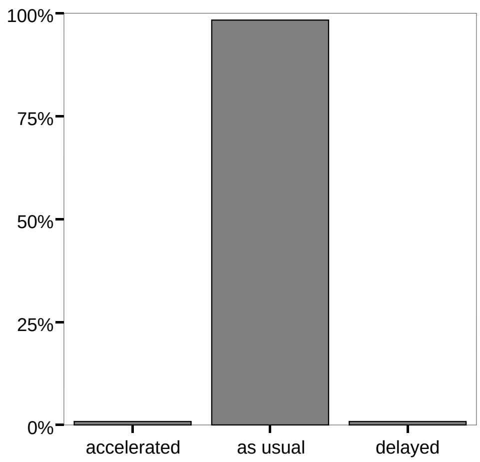

Figure 3.15: Plant growth and development of MON 810 compared to conventional maize in 2011

Both valid percentages for accelerated (0.8%) and delayed (0.8%) plant growth and development are less than the 10% threshold. The resulting P value is less than the level of significance $\alpha = 0.01$ (Table 3.47) for $f_{accelerated}$ and $f_{delayed}$. Therefore both null hypothesis $f_{accelerated} \geq 0.1$ and $f_{delayed} \geq 0.1$ can be rejected with a power of 100.0%. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.47: Results of the binomial tests for different plant growth and development of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	2 (0.8%)	< 0.01	245 (98.4%)	2 (0.8%)	< 0.01

Incidence of stalk/root lodging

Incidence of stalk/root lodging was assessed to be less frequent in MON 810 compared to conventional maize in 24.5% (61/249) of all cases (Table 3.48, Figure 3.16).

Table 3.48: Incidence of stalk/root lodging of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less often	61	24.5	24.5	24.5
	as usual	188	75.5	75.5	100.0
	more often	0	0.0	0.0	100.0
Total		249	100.0	100.0	

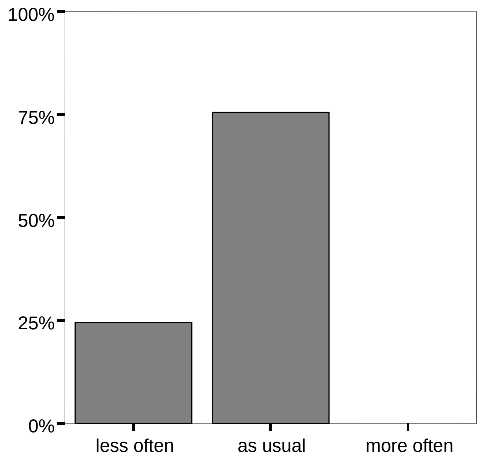

Figure 3.16: Incidence of stalk/root lodging of MON 810 compared to conventional maize in 2011

The valid percentage of higher incidence of stalk/root lodging (0.0%) does not exceed the 10% threshold. The resulting P value is smaller than the level of significance $\alpha = 0.01$ (Table 3.49) and therefore, the corresponding null hypothesis $f_{more} \geq 0.1$ could be rejected with a power of 100.0%. But the valid percentage of lower incidence of stalk/root lodging (24.5%) does exceed the 10% threshold. The resulting P value is greater than the level of significance $\alpha = 0.01$ and therefore, the corresponding null hypothesis $f_{less} \geq 0.1$ could not be rejected and clearly indicates an effect on the incidence of stalk/root lodging of MON 810. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.49: Results of the binomial tests for different incidence of stalk/root lodging of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	61 (24.5%)	1.0	188 (75.5%)	0 (0.0%)	< 0.01

Time to maturity

12.9% (32/249) of the farmers assessed the time to maturity to be delayed for MON 810, while no farmer (0.0%, 0/249) assed it to be accelerated (Table 3.50, Figure 3.17).

Table 3.50: Time to maturity of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	accelerated	0	0.0	0.0	0.0
	as usual	217	87.1	87.1	87.1
	delayed	32	12.9	12.9	100.0
Total		249	100.0	100.0	

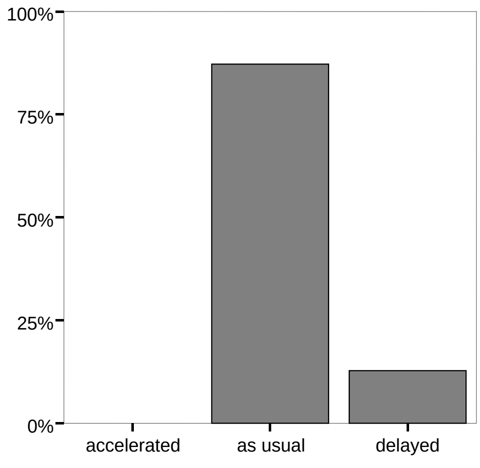

Figure 3.17: Time to maturity of MON 810 compared to conventional maize in 2011

The valid percentage of accelerated time to maturity (0.0%) does not exceed the 10% threshold. The resulting P value is smaller than the level of significance $\alpha = 0.01$ (Table 3.51) and the null hypothesis $f_{accelerated} \geq 0.1$ can be rejected with a power of 100.0%. But the valid percentage of delayed time to maturity (12.9%) does exceed the 10% threshold. The resulting P value is greater than level of significance $\alpha = 0.01$ and therefore, the corresponding null hypothesis $f_{delayed} \geq 0.1$

could not be rejected and clearly indicates an effect on the time to maturity of MON 810. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.51: Results of the binomial tests for different time to maturity of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	0 (0.0%)	< 0.01	217 (87.1%)	32 (12.9%)	0.942

Yield

Yield was higher in 43.4% (108/249) of all cases (Table 3.52, Figure 3.18).

Table 3.52: Yield of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	lower yield	0	0.0	0.0	0.0
	as usual	141	56.6	56.6	56.6
	higher yield	108	43.4	43.4	100.0
Total		249	100.0	100.0	

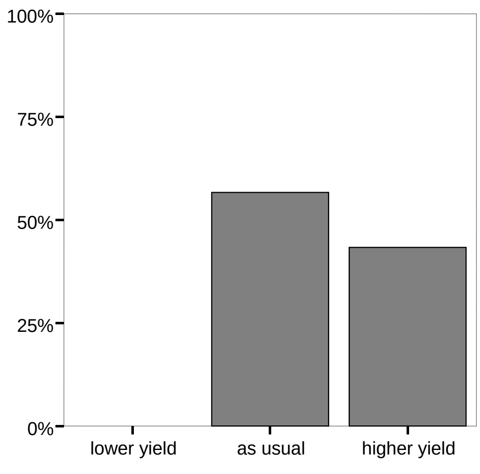

Figure 3.18: Yield of MON 810 compared to conventional maize in 2011

The valid percentage of lower yield (0.0%) does not exceed the 10% threshold. The resulting P value is smaller the than level of significance $\alpha = 0.01$ (Table 3.53) and therefore, the corresponding null hypothesis $f_{lower} \geq 0.1$ could be rejected with a power of 99.9%. But the valid percentage of higher yield (43.4%) does exceed the 10% threshold. The resulting P value is greater the than level of significance $\alpha = 0.01$ and therefore, the corresponding null hypothesis $f_{higher} \geq 0.1$ could not be rejected and clearly indicates an effect on yield of MON 810. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.53: Results of the binomial tests for different yield of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	0 (0.0%)	< 0.01	141 (56.6%)	108 (43.4%)	1.0

Occurrence of volunteers

The occurrence of volunteers was assessed to be less frequent for MON 810 than for conventional maize in 6.9% (17/245) of the valid cases (Table 3.54, Figure 3.19).

Table 3.54: Occurrence of MON 810 volunteers compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less often	17	6.8	6.9	6.9
	as usual	228	91.6	93.1	100.0
	more often	0	0.0	0.0	100.0
	Total	245	98.4	100.0	
Missing	no statement	4	1.6		
Total		249	100.0		

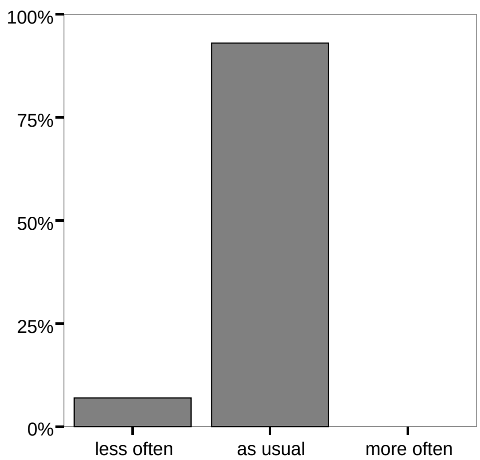

Figure 3.19: Occurrence of MON 810 volunteers compared to conventional maize in 2011

The valid percentage of lower and higher occurrence of volunteers does not exceed the 10% threshold. The resulting P value for higher occurence of volunteers is smaller than the level of significance $\alpha = 0.01$ (Table 3.55) and therefore, the corresponding null hypothesis $f_{more} \geq 0.1$ could be rejected with a power of 100%. But the resulting P value of the lower occurrence of volunteers is greater than the level of significance $\alpha = 0.01$ and therefore, the corresponding null hypothesis $f_{less} \geq 0.1$ could not be rejected and indicates an effect on occurrence of MON 810 volunteers. Individual explanations for these observations are given in Appendix A, Table A.7.

Table 3.55: Results of the binomial tests for different occurrence of MON 810 volunteers compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
245	17 (6.9%)	0.063	228 (93.1%)	0 (0.0%)	< 0.01

All additional observations of the farmers during plant growth are listed in Appendix A, Table A.8.

Assessment of differences in the characteristics of MON 810 in the field (compared to conventional maize)

A summary of these results for the characteristics of MON 810 in the field compared to conventional maize shows:

- **an unchanged germination,**
- **an unchanged time to emergence,**
- **an unchanged time to male flowering,**
- **an unchanged plant growth and development,**
- **a lower incidence of stalk/root lodging,**
- **a delayed time to maturity,**
- **a higher yield and**
- **a lower occurrence of MON 810 volunteers.**

Corn borer damage affects maturation and especially yield negatively, therefore the differences in these monitoring characters can be explained by the absence of corn borer damage.

The difference in the incidence of stalk/root lodging can also be explained this way. Therefore, differences in these parameters are anticipated and only underline the effectiveness of corn borer control.

The longer time to maturity might also be an effect of corn borer control: in the presence of pests, plants need to reach maturity faster. In the absence of pest pressure, plants can maximize the output of biomass and have a longer period of seed set and ripening. This could explain the longer time to maturity reported for MON 810 by 12.9% of farmers. The low percentage indicates that this phenomenon is restricted to areas of pest pressure. If this

were a more general effect, the valid percentage of farmers reporting on this would be much higher.

The difference in occurrence of volunteers in MON 810 might be explained by less lodging because of the very good insect control resulting to a better and more effective harvest. Volunteers grow from seed kernels lost before and during harvest, so a probable explanation for the reported difference is that less cobs/kernels are lost before and during harvest, because of less corn borer damage resulting in better maturation of the plants and less lodging. Less lodging facilitates a more efficient harvest by the combines.

3.3.3 Disease susceptibility in MON 810 fields (compared to conventional maize)

Farmers assessed MON 810 to be less susceptible to diseases, 19.7% (49/249) (Table 3.56, Figure 3.20).

Table 3.56: Disease susceptibility in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less susceptible	49	19.7	19.7	19.7
	as usual	200	80.3	80.3	100.0
	more susceptible	0	0.0	0.0	100.0
Total		249	100.0	100.0	

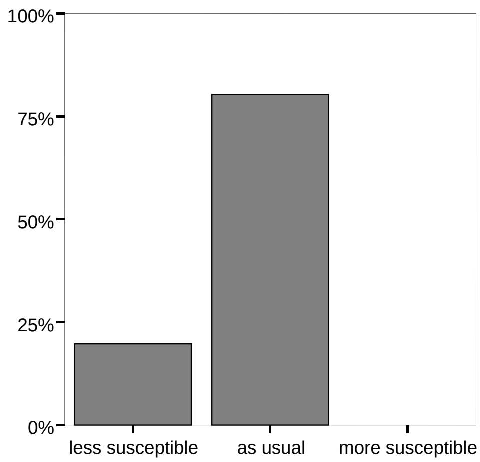

Figure 3.20: Disease susceptibility in MON 810 compared to conventional maize in 2011

The valid percentage of higher disease susceptibility (0.0%) does not exceed the 10% threshold. The resulting P value is samller than the level of significance $\alpha = 0.01$ (Table 3.57) and therefore, the corresponding null hypothesis $f_{more} \geq 0.1$ could be rejected with a power of 100%. But the valid percentage of lower disease susceptibility (19.7%) does exceed the 10% threshold. The resulting P value is greater than the level of significance $\alpha = 0.01$ and therefore, the corresponding null hypothesis $f_{less} \geq 0.1$ could not be rejected and clearly indicates an effect on disease susceptibility.

Table 3.57: Results of the binomial tests for different disease susceptibility of MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	49 (19.7%)	1.0	200 (80.3%)	0 (0.0%)	< 0.01

The 49 farmers that answered different from "as usual" were asked to specify the difference in disease susceptibility by listing the diseases with an explanation. Table 3.58 lists the reported diseases with an assessment of the disease susceptibility of MON 810, compared to conventional maize. This list shows that the lower disease susceptibility was predominantly attributed to a lower susceptibility to *Fusarium* spp. (14.5%, 36/249); to a lesser extent, a lower susceptibility to *Ustilago maydis* (9.6%, 24/249), *Helminthosporium* spp. (5.2%, 13/249), as well as some other fungal and viral diseases was also mentioned.

Table 3.58: Specification of differences in disease susceptibility in MON 810 compared to conventional maize in 2011

Group	Species	Different	More	Less
Fungus	*Fusarium* spp.	37	1	36
	Ustilago maydis	25	1	24
	Helminthosporium spp.	13	-	13
	Cephalosporium spp.	7	-	7
	Rhizoctonia solani	6	-	6
	Puccinia sorghi	6	-	6
	Gibberella zeae	3	-	3
	Erwinia	2	-	2
	Sphacelotheca reiliana	2	-	2
	Hongos generos Fusarium	1	-	1
	MDMV and *MRDV*	1	-	1

Additional comments on disease susceptibility are given in Appendix A, Table A.9.

Assessment of differences in disease susceptibility in MON 810 fields (compared to conventional maize)

The differences were indicated to have been observed for a number of different fungal species, most notably *Fusarium* spp., *Ustilago maydis* and *Helminthosporium* spp.

This observation is not surprising, since it has been well established that feeding holes and tunnels of the corn borer serve as entry points for secondary fungal infections, especially of the *Fusarium* spp. *Ustilago maydis* also has a high incidence especially with stressed plants (water stress, mechanical wounding, insect feeding damage), so that any reduction of a stress factor would immediately result in a lower incidence of disease. Therefore, the observed differences can be explained by corn borer control and confirm previous observations of lower fungal infections in MON 810 reported in the scientific literature (Munkvold et al., 1999 [11]; Bakan et al., 2002 [1]; Hammond et al., 2003 [9]; Wu, 2006 [37]). The farmers' testimony (Appendix A, Table A.9) thus corroborate previous findings.

3.3.4 Insect pest control in MON 810 fields (compared to conventional maize)

The insect pest control of *Ostrinia nubilalis* (European corn borer) was assessed to be very good or good in 100.0% (247/247) of the valid cases (Table 3.59, Figure 3.21).

Table 3.59: Insect pest control of *Ostrinia nubilalis* in MON 810 in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	weak	0	0.0	0.0	0.0
	good	33	13.3	13.4	13.4
	very good	214	85.9	86.6	100.0
	Total	247	99.2	100.0	
Missing	do not know	2	0.8		
Total		249	100.0		

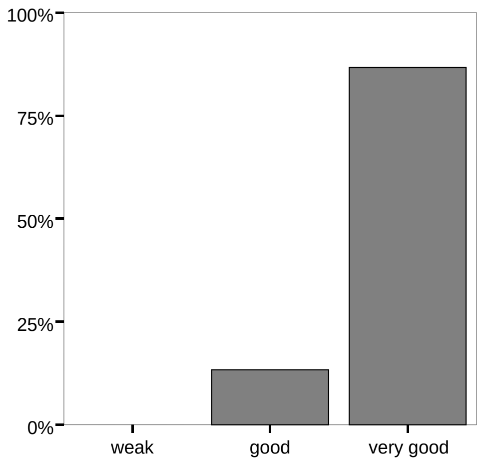

Figure 3.21: Insect pest control of *Ostrinia nubilalis* in MON 810 in 2011

This high percentage clearly indicates an effect (Table 3.60). The null hypothesis $f_{very\ good} \leq 0.1$ cannot be rejected. This effect is expected because MON 810 is genetically modified to be protected against this pest.

Table 3.60: Results of the binomial tests for Insect pest control of *Ostrinia nubilalis* in MON 810 in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
247	0 (0.0%)	< 0.01	33 (13.4%)	214 (86.6%)	1.0

100.0% (193/193) of the farmers who gave a valid answer attested a good or very good control of *Sesamia* spp. (Table 3.61, Figure 3.22). The high percentage of missing values in efficacy of MON 810 against *Sesamia* spp. (Pink Borer) resulted from the fact that this question was not answered in the Czech Republic, Slovakia and Poland since the pest is just not present in these countries.

Table 3.61: Insect pest control of *Sesamia* spp. in MON 810 in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	weak	0	0.0	0.0	0.0
	good	27	10.8	14.0	14.0
	very good	166	66.7	86.0	100.0
	Total	193	77.5	100.0	
Missing	No statement	56	22.5		
Total		249	100.0		

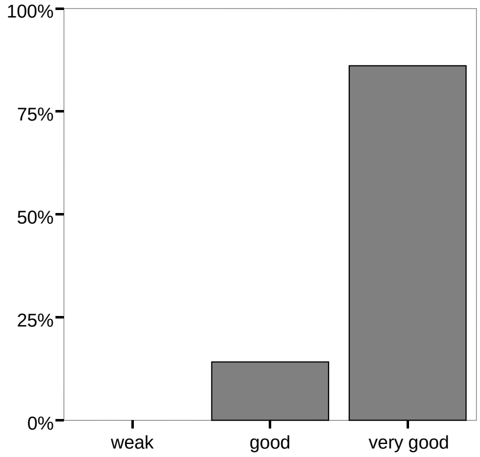

Figure 3.22: Insect pest control of *Sesamia* spp. in MON 810 in 2011

This high percentage clearly indicates an effect (Table 3.62). The null hypothesis $f_{very\ good} \geq 0.1$ can not be rejected. This effect is expected because MON 810 is genetically modified to be protected against this pest.

Table 3.62: Results of the binomial tests for Insect pest control of *Sesamia* spp. in MON 810 in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
193	0 (0.0%)	< 0.01	27 (14.0%)	166 (86.0%)	1.0

Additional comments on insect pest control are listed in Appendix A, Table A.10.

Assessment of insect pest control in MON 810 fields (compared to conventional maize)

The results show that both pests (*Ostrinia nubilalis* and *Sesamia* spp.) are effectively controlled by MON 810.

3.3.5 Other pests (other than *Ostrinia nubilalis* and *Sesamia* spp.) in MON 810 fields (compared to conventional maize)

Farmers assessed MON 810 to be less susceptible to pests in 17.7% (44/249) of all cases (Table 3.63, Figure 3.23).

Table 3.63: Pest susceptibility of MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less susceptible	44	17.7	17.7	17.7
	as usual	205	82.3	82.3	100.0
	more susceptible	0	0.0	0.0	100.0
Total		249	100.0	100.0	

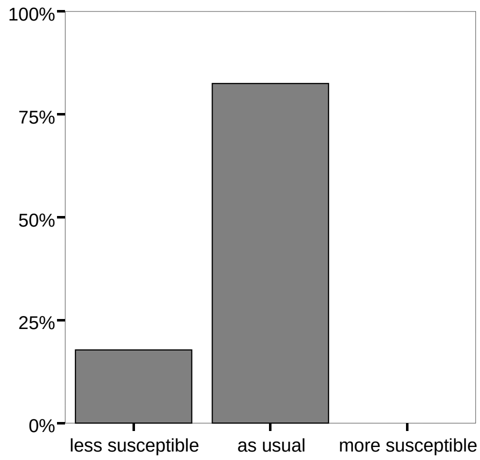

Figure 3.23: Pest susceptibility of MON 810 compared to conventional maize in 2011

The valid percentage of lower pest susceptibility (17.7%) does exceed the 10% threshold. The resulting P value of lower pest susceptibility is greater than the level of significance $\alpha = 0.01$ (Table 3.64) and therefore, the corresponding null hypothesis $f_{less} \geq 0.1$ could not be rejected and indicates an effect on pest susceptibility.

Table 3.64: Results of the binomial tests for different pest susceptibility in MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
249	44 (17.7%)	1.0	205 (82.3%)	0 (0.0%)	< 0.01

The 44 farmers that answered different from as usual were asked to specify the difference in pest susceptibility by listing the pests with an explanation. Table 3.65 lists the reported pests with an assessment of the pest susceptibility of MON 810, compared to conventional maize. This list shows that the lower pest susceptibility was predominantly attributed to a lower susceptibility to pests of the order Lepidoptera.

Table 3.65: Specification of differences in pest susceptibility in MON 810 compared to conventional maize in 2011

Order	Name	different	less	more
Lepidoptera	*Agrotis* spp.	32	32	-
	Spodoptera spp.	17	17	-
	Heliotis	13	13	-
	Mythimna spp.	1	1	-
Arachnida	*Tetranychus* spp.	7	7	-
	Red spider	2	2	-
Coleoptera	*Diabrotica virgifera*	5	5	-
	Agriotes spp.	1	1	-
Diptera	Mosquitos	2	2	-

If the answers concerning Lepidopteran pests are removed the pest susceptibility is $As\ ususal$ in 91.9% of the left valid cases (Table 3.66, Figure 3.24).

Table 3.66: Pest susceptibility of MON 810 compared to conventional maize in 2011 when Lepidoptera is removed

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less susceptible	18	7.2	8.1	8.1
	as usual	205	82.3	91.9	100.0
	more susceptible	0	0.0	0.0	100.0
Total		223	100.0	100.0	

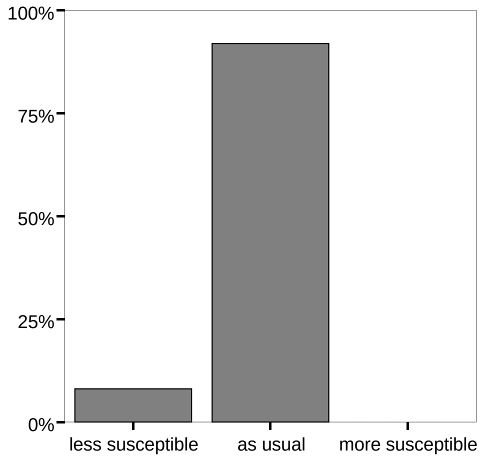

Figure 3.24: Pest susceptibility of MON 810 compared to conventional maize in 2011 when Lepidoptera is removed

The data on susceptibility to other pests than Lepidoptera were analysed separately for each order of pests. As shown in Table 3.67 there is no effect on susceptibility to every single order of pests indicated. Here the percentages of lower or higher susceptibility do not exceed the threshold of 10% and none of the resulting P values is greater than the level of significance $\alpha = 0.01$.

Table 3.67: Results of the binomial tests for single order susceptibilities of MON 810 compared to conventional maize in 2011 when Lepidoptera is removed

	N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
Arachnida	223	9 (4.0%)	< 0.01	214 (96.0%)	0 (0.0%)	< 0.01
Coleoptera	223	6 (2.7%)	< 0.01	217 (97.3%)	0 (0.0%)	< 0.01
Diptera	223	2 (0.9%)	< 0.01	221 (99.1%)	0 (0.0%)	< 0.01

Additional comments on other pest (other than *Ostrinia nubilalis* and *Sesamia* spp.) are given in Appendix A, Table A.11.

Assessment of differences in susceptibility to other pests in MON 810 fields (compared to conventional maize)

The data show that the susceptibility to other pests in MON 810 is unchanged, except for those belonging to the order of Lepidoptera. This is not surprising, given the plethora of scientific studies on laboratory and field experiments showing that the Cry protein expressed in MON 810 does not have a negative effect on any insects other than those belonging to the order for which they specifically have toxic properties (Marvier et al., 2007 [10]; Wolfenbarger et al., 2008 [36]). The monitoring data thus corroborate the conclusions drawn during the environmental risk assessment and ongoing research. As reflected by the farmers (Appendix

A, Table A.11), pest incidence of other pests was higher, because no conventional insecticides were applied and thus other pests were not controlled (in comparison to conventional maize, where insecticides were applied).

3.3.6 Weed pressure in MON 810 fields (compared to conventional maize)

No farmer observed a difference for weed pressure in MON 810 fields compared to conventional fields (Table 3.68).

Table 3.68: Weed pressure in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less weeds	0	0.0	0.0	0.0
	as usual	249	100.0	100.0	100.0
	more weeds	0	0.0	0.0	100.0
Total		249	100.0	100.0	

The farmers were asked to name the three most abundant weeds in their MON 810 fields. The six most named weeds are

- *Sorghum halapense*
- *Abutilon theophrasti*
- *Chenopodium* spp.
- *Setaria* spp.
- *Echinocloa* spp.
- *Amaranthus* spp.

All named weeds and the corresponding frequencies of nomination are listed in Appendix A, Table A.13.

Assessment of differences in weed pressure in MON 810 fields (compared to conventional maize)

It is not surprising that the weed pressure in MON 810 fields has been described to be similar to that in conventional maize. In accordance with the observations described in Section 3.3.1, no changes in weed control practices were reported in MON 810 fields compared to conventional maize fields.

3.3.7 Occurrence of wildlife in MON 810 fields (compared to conventional maize)

Occurrence of non target insects

Farmers assessed the occurrence of non target insects in MON 810 fields to be as usual in 98.7% (232/235) of the valid cases. 0.9% (2/235) observed less non target insects and 0.4% (1/235) observed more non target insects in their MON 810 field (Table 3.69, Figure 3.25).

Table 3.69: Occurrence of non target insects in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less	2	0.8	0.9	0.9
	as usual	232	93.2	98.7	99.6
	more	1	0.4	0.4	100.0
	Total	235	94.4	100.0	
Missing	do not know	14	5.6		
Total		249	100.0		

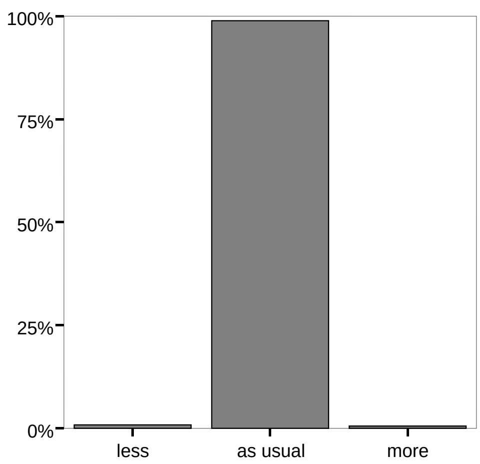

Figure 3.25: Occurrence of non target insects in MON 810 compared to conventional maize in 2011

Valid percentages for both more and less non target insects do not exceed the 10% threshold. The resulting P values are less than the level of significance $\alpha = 0.01$ (Table 3.70). Therefore, the null hypotheses $f_{more} \geq 0.1$ and $f_{less} \geq 0.1$ are rejected with a power of 99.9% and no effect on occurrence of non target insects is indicated.

Specifications on the occurrence of insects are listed in Appendix A, Table A.14.

Table 3.70: Results of the binomial tests for different occurrence of non target insects in MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
235	2 (0.8%)	< 0.01	232 (98.7%)	1 (0.4%)	< 0.01

Occurrence of birds

Farmers assessed the occurrence of birds in MON 810 fields to be as usual in 99.6% (238/239) of the valid cases. 0.4% (1/239) of the farmers observed less birds in the MON 810 fields (Table 3.71, Figure 3.26).

Table 3.71: Occurrence of birds in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less	1	0.4	0.4	0.4
	as usual	238	95.6	99.6	100.0
	more	0	0.0	0.0	100.0
	Total	239	96.0	100.0	
Missing	do not know	10	4.0		
Total		249	100.0		

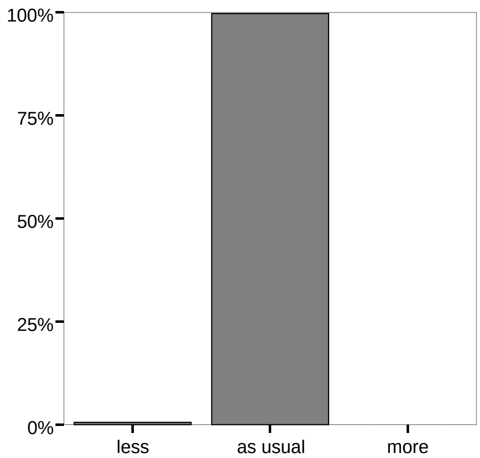

Figure 3.26: Occurrence of birds in MON 810 compared to conventional maize in 2011

Valid percentages for both more and less birds do not exceed the 10% threshold. The resulting P values are less than the level of significance $\alpha = 0.01$ (Table 3.72). Therefore, the null hypotheses $f_{more} \geq 0.1$ and $f_{less} \geq 0.1$ are rejected with a power of 99.9% and no effect on occurrence of birds is indicated.

Table 3.72: Results of the binomial tests for different occurrence of birds in MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
239	3 (0.4%)	< 0.01	228 (99.6%)	0 (0.0%)	< 0.01

Specifications on the occurrence of birds are listed in Appendix A, Table A.15.

Occurrence of mammals

Farmers assessed the occurrence of mammals in MON 810 fields to be as usual in 99.2% (235/237) of the valid cases. 0.4% (1/237) observed less mammals and 0.4% (1/237) observed more mammals in their MON 810 field (Table 3.73, Figure 3.27).

Table 3.73: Occurrence of mammals in MON 810 compared to conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	less	1	0.4	0.4	0.4
	as usual	235	94.4	99.2	99.6
	more	1	0.4	0.4	100.0
	Total	237	95.2	100.0	
Missing	do not know	12	4.8		
Total		249	100.0		

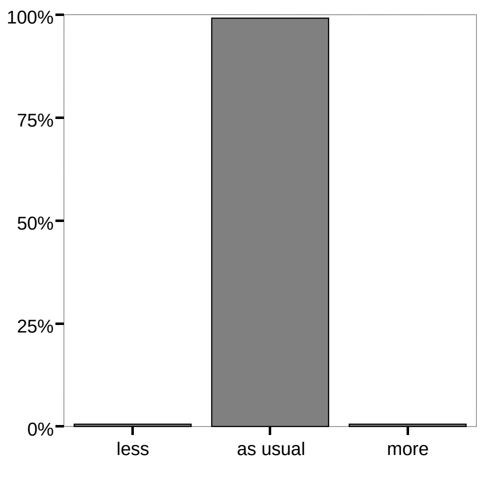

Figure 3.27: Occurrence of mammals in MON 810 compared to conventional maize in 2011

Valid percentages for both more and less birds do not exceed the 10% threshold. The resulting P values are less than the level of significance $\alpha = 0.01$ (Table 3.74). Therefore, the null hypotheses

$f_{more} \geq 0.1$ and $f_{less} \geq 0.1$ are rejected with a power of 99.9% and no effect on occurrence of mammals is indicated.

Table 3.74: Results of the binomial tests for different occurrence of mammals in MON 810 compared to conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
237	1 (0.4%)	< 0.01	235 (99.2%)	0 (0.4%)	< 0.01

Specifications on the occurrence of mammals are listed in Appendix A, Table A.16.

Assessment of differences in occurrence of wildlife in MON 810 fields (compared to conventional maize)

The occurrence of wildlife in MON 810 is reported to be unchanged for non target insects, birds and mammals.
These results again underline the specificity of the expressed Cry protein towards Lepidoptera, exhibiting no effect on other wildlife, especially non target insects. MON 810 thus is substantially equivalent to conventional maize and hosts the same wildlife. Birds are dependent on insects and wild plants in the agricultural landscape, and are a good indicator for larger scale level effects. The same holds true for mammals, although their occurrence in maize is limited. Studies have shown that no impact on mammals caused by the consumption of MON 810 is to be expected (Shimada et al., 2003 [23], 2006a [24], 2006b [25]; Stumpff et al., 2007 [32]; Bondzio et al., 2008 [5]).

3.3.8 Feed use of MON 810 (if previous year experience with MON 810)

17.3% (43/249) of the asked farmers used the harvest of MON 810 to feed their animals (Table 3.75). These data reflect only the range of feeding. We assume that only farmers that cultivate silage maize feed them to their livestock. That could be the reason why only 17.3% of the surveyed farmers fed MON 810, but there are no strong data supporting this assumption.

Table 3.75: Use of MON 810 harvest for animal feed in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	43	17.3	17.3	17.3
	no	206	82.7	82.7	100.0
Total		249	100.0	100.0	

10.5% (4/38) of the farmers who gave a valid answer to the question on the performance of the animals fed MON 810 observed a different performance of them compared to the animals fed conventional maize (Table 3.76, Figure 3.28).

Table 3.76: Performance of the animals fed MON 810 compared to the animals fed conventional maize in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	as usual	34	79.1	89.5	89.5
	different	4	9.3	10.5	100.0
	Total	38	88.4	100.0	
Missing	do not know	5	11.6		
Total		43	100.0		

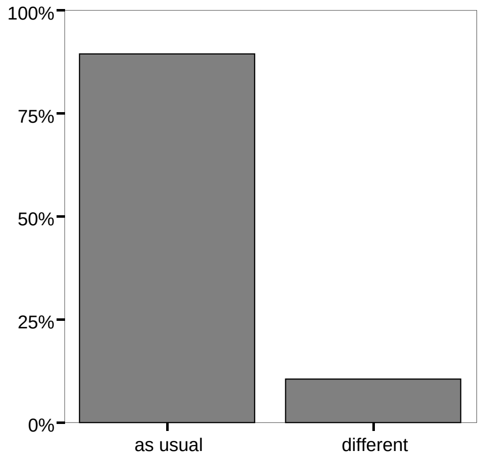

Figure 3.28: Performance of the animals fed MON 810 compared to the animals fed conventional maize in 2011

The valid percentage for different performance of the animals fed MON 810 does exceed the 10% threshold, and the P value is greater than the level of significance $\alpha = 0.01$ (Table 3.77). The null hypothesis for $f_{less} \geq 0.1$ cannot be rejected, so an effect on performance of animals fed MON 810 is indicated.

Table 3.77: Results of the binomial test for different performance of the animals fed MON 810 compared to the animals fed conventional maize in 2011

N valid	$Minus$	P for $p_0 = 0.1$	$As\ usual$	$Plus$	P for $p_0 = 0.1$
38			34 (89.5%)	4 (10.5%)	0.670

Assessment of differences in feed use of MON 810 (if previous year experience with MON 810)

Four farmers from Czech Republic (Appendix A, Table A.17) reported a better health of their animals when fed MON 810, because of a lower incidence of mycotoxins in the feed (due to lower ECB feeding damage on the plant).

Mycotoxin contaminated animal feed leads to food refusal, lower food conversion, increased disease in animals, lower weight gain and overall diminished health of animals. A reduction of the incidence and level of mycotoxins in MON 810 is thus beneficial to the animals and led to a difference in animal performance.

3.3.9 Any additional remarks or observations

Additional remarks or observations are listed in Appendix A, Table A.18. No unexpected adverse effects are reported.

3.4 Part 4: Implementation of *Bt* maize specific measures

3.4.1 Information on good agricultural practices on MON 810

98.8% (246/249) of the farmers reported have been informed about the good agricultural practices applicable to MON 810 (Table 3.78).

Table 3.78: Information on good agricultural practices in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	246	98.8	98.8	98.8
	no	3	1.2	1.2	100.0
Total		249.0	100.0	100.0	

98.0% (241/246) of the farmers considered the training sessions to be either useful or very useful (Table 3.79). This information indicates that the great majority of the farmers had been exposed to a valuable training concerning MON 810.

Table 3.79: Evaluation of training sessions in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	very useful	80	32.1	32.5	32.5
	useful	161	64.7	65.4	98.0
	not useful	5	2.0	2.0	100.0
	Total	246	98.8	100.0	
Missing	No statement	3	1.2		
Total		249	100.0		

3.4.2 Seed

The question "was the bag labeled with accompanying documentation indicating that the product is genetically modified maize MON 810" was answered with "yes" in all cases. This indicated that the bags were labeled appropriately and that the label and the accompanying documentation were clear to the farmers.

The great majority of the farmers (97.6%) reported that they are following the label recommendations on the seed bags (Table 3.80). 6 farmers (2.4%) from Spain admitted that they did not follow the label recommendation, in the most cases their deviation was the planting of a refuge.

Deviations from the label recommendations are listed in Appendix A, Table A.19.

Table 3.80: Compliance with label recommendations in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	243	97.6	97.6	97.6
	no	6	2.4	2.4	100.0
Total		249	100.0	100.0	

3.4.3 Prevention of insect resistance

While 5.6% (14/249) of the farmers did not plant a refuge because they had less than 5 ha of maize in the farm (the Insect Resistance Management Plan states that no refuge is required if less than 5 hectares are planted), 92.0% (229/249) did plant a refuge (Table 3.81). So 97.6% (243/249) of the farmers did follow the label recommendations, which corresponds to the 97.6% (243/249) of all farmers claiming to be compliant with them (Table 3.80). 2.4% (6/249) of the farmers reported that they did not plant a refuge.

Table 3.81: Plant refuge in 2011

		Frequency	Percent	Valid percentages	Accumulated percentages
Valid	yes	229	92.0	92.0	92.0
	no, because the surface of *Bt* maize is < 5 ha	14	5.6	5.6	97.6
	no	6	2.4	2.4	100.0
Total		249	100.0	100.0	

In Spain in 2011, among the farmers who were required to plant a refuge (i.e. farm growing more than 5 ha of maize), 95.7% of them (134/140) did it (Table 3.82).

Table 3.82: Refuge implementation per country in 2011

	Country	Yes	No, because the surface of *Bt* maize is < 5 ha	No	Total
Valid	Spain	134	10	6	150
	Portugal	42	0	0	42
	Czech Republic	29	0	0	29
	Slovakia	3	0	0	3
	Romania	15	0	0	15
	Poland	6	4	0	10
Total		229	14	6	249

The allover compliance this year is on the highest level since the beginning of monitoring in 2006. This is due to the continuous and intensive training of farmers about implementing a refuge. Even in Spain, the country with the longest tradition and highest level of MON 810 cultivation, only 4% of the farmers did not comply with the label recommendations, i.e. not planted a refuge.

Reasons for not planting a refuge are listed in Appendix A, Table A.20.

Chapter 4

Conclusions

The analysis of 249 questionnaires from a survey of farmers cultivating MON 810 in 2011 in six European countries did not reveal any unexpected adverse effects that could be associated with the genetic modification in MON 810. The sample size was proven to be large enough to significantly reject the hypotheses on adverse effects under the specific 2011 conditions.

The statistically significant effects reported in Part 3 were neither unexpected nor adverse. The corresponding observations mostly correlate to the intended insect protection trait present in MON 810.

This set of data is entered in a database, and complements data collected from the 2006 to 2010 growing seasons. Currently, the database contains data of 1599 valid questionnaires. The survey will be conducted year after year with new entries generated in following season's questionnaires to provide a long term analysis of the effects of cultivation of MON 810 in Europe.

As shown in Tables 4.1 and 4.2 the frequency patterns of farmers' answers in 2011 are similar to those of the previous years. In general the same effects have been observed.

After five years of farmers surveys no unexpected adverse effects are indicated. Compared to the cultivating practices in conventional maize farmers use nearly the same practices for cultivating MON 810. Because there are no damages of corn borers on the plant, it is healthier overall and therefore it gives more yield.

The data of the influencing factors differ between the years, but the data of the monitoring characters show nearly the same effects every year.

Table 4.1: Overview on the frequency of $Minus^1$ answers of the monitoring characters in 2006 - 2011 in percent [%]

Monitoring characters[1]	2006	2007	2008	2009	2010	2011
Time of planting	1.6	3.4	2.7	2.9	1.8	1.2
Time of harvest	2.4	3.8	3.4	2.1	2.2	0.4
Germination vigor	6.0	4.1	1.7	0.8	0.0	0.0
Time to emergence	6.9	3.1	6.4	5.4	4.1	0.8
Time to male flowering	0.4	1.7	4.7	2.1	3.7	0.0
Plant growth and development	6.5	6.9	9.8	5.9	7.0	0.8
Incidence of stalk / root lodging	58.9	36.2	38.6	31.9	35.1	24.5
Time to maturity	2.0	4.8	4.3	2.9	4.1	0.0
Yield	2.4	3.9	4.4	1.7	1.8	0.0
Occurrence of volunteers	33.9	8.4	11.1	10.8	8.2	6.9
Disease susceptibility	36.1	21.7	34.7	29.2	25.6	19.7
Insect pest control (ECB)	0.4	0.0	0.4	0.4	0.4	0.0
Insect pest control (PB)	0.0	0.0	0.0	0.0	0.0	0.0
Pest susceptibility	11.1	5.9	18.5	17.2	18.6	17.7
Weed pressure	0.4	2.1	1.7	2.1	4.8	0.0
Occurrence of wildlife[4]	2.9	6.1	7.7			
Occurrence of non target insects[2]				0.9	0.8	0.9
Occurrence of birds[2]				0.4	1.2	0.4
Occurrence of mammals[2]				0.9	1.1	0.4

For grey highlighted frequency values the test against the 10% threshold resulted in P values greater than 0.01, so the null hypotheses could not be rejected.

[1] Monitoring characters and their categories are defined in section 2.2.

[2] These characters are surveyed since the 2009 season.

[3] This character is surveyed since the 2008 season.

[4] The question on wildlife was asked until 2008. In 2009 it was split into three questions (non target insects, birds, mammals).

Table 4.2: Overview on the frequency of *Plus*[1] answers of the monitoring characters in 2006 - 2011 in percent [%]

Monitoring characters[1]	2006	2007	2008	2009	2010	2011
Crop rotation[2]				0.8	1.8	0.8
Time of planting	5.9	3.8	2.7	1.3	4.1	1.6
Tillage and planting technique	0.0	0.7	0.0	0.4	0.4	0.0
Insect control practices	48.0	11.9	22.2	18.3	16.26	24.9
Maize Borer control practice[3]			9.8	22.9	15.5	22.9
Weed control practices	0.4	0.3	0.3	0.0	0.4	0.0
Fungal control practices	0.0	1.1	0.3	0.4	0.0	0.0
Fertilizer application	0.8	0.3	0.0	0.4	0.4	0.0
Irrigation Practices	1.6	0.0	0.0	0.0	0.4	0.0
Time of harvest	24.1	18.6	13.8	7.9	6.6	4.4
Germination vigor	8.0	6.9	11.4	14.6	16.2	5.6
Time to emergence	5.7	3.8	2.0	0.8	0.4	0.0
Time to male flowering	1.6	7.7	3.7	1.7	2.6	2.0
Plant growth and development	1.6	4.8	2.7	2.1	3.7	0.8
Incidence of stalk / root lodging	1.6	0.3	0.3	0.0	2.2	0.0
Time to maturity	30.9	25.9	24.0	14.6	16.2	15.9
Yield	68.7	44.8	52.7	56.9	49.8	43.4
Occurrence of volunteers	0.0	1.7	0.0	0.0	0.4	0.0
Disease susceptibility	2.0	1.0	0.7	0.4	0.4	0.0
Insect pest control (ECB)	96.4	86.3	86.3	93.7	85.6	86.6
Insect pest control (PB)	91.0	83.9	85.4	99.3	84.5	86.0
Pest susceptibility	1.2	1.4	0.7	1.3	0.0	0.0
Weed pressure	0.0	0.3	0.3	0.0	0.4	0.0
Occurrence of wildlife[4]	2.1	2.9	2.4			
Occurrence of non target insects[2]				0.9	0.4	0.4
Occurrence of birds[2]				0.0	0.8	0.0
Occurrence of mammals[2]				1.3	1.1	0.4
Performance of animals	0.0	6.7	4.9	8.9	12.3	10.5

For grey highlighted frequency values the test against the 10% threshold resulted in P values greater than 0.01, so the null hypotheses could not be rejected.

[1] Monitoring characters and their categories are defined in section 2.2.

[2] These characters are surveyed since the 2009 season.

[3] This character is surveyed since the 2008 season.

[4] The question on wildlife was asked until 2008. In 2009 it was split into three questions (non target insects, birds, mammals).

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Appendix A

Tables of free entries

Table A.1: Specifications for changed crop rotation before planting MON 810 (Section 3.1)

Country	**Quest. Nr.**	**Crop rotation**	**Comments**
Czech Republic	3529	changed	YieldGard was sown where last year was conventional maize
Czech Republic	3534	changed	The field had maize as forecrop

Table A.2: Specifications for earlier or later planting of MON 810 (Section 3.1)

Country	Quest. Nr.	Planting time	Comments aggregate	Comments
Czech Republic	3512	earlier	variety	Early hybrid, grain purchase buy as first GMO maize and then conventional maize
Czech Republic	3514	earlier	flexibility	land was previously used
Czech Republic	3515	earlier	flexibility	GMO sowed two days earlier
Spain	3432	later	flexibility	I sow conventional maize before, in order don´t have ECB attacks
Czech Republic	3517	later	flexibility	first conventinal and then GMO
Slovakia	3509	later	weather	waterlogged land
Romania	3353	later	variety	YieldGard drilled later, priority was to drill first late conventional hybrids

Table A.3: Insecticides applied in MON 810 (Section 3.1) differentiated by their use

Active	**Insecticide as cited by the farmer**	**Spain**	**Portugal**	**Czech Republic**	**Slovakia**	**Romania**	**Poland**	**Total**
Seed treatment								
Clotianidin	Insect 5G, Poncho, Zeldox	121	16	1	1	1	140	
Imidachloprid	Gaucho		42	1		5	48	
Thiametoxam	Cruiser		17	1		5	23	
Fipronil	Regent	4					4	
Total		125	75	3	1	11	215	
Spray								
Lambda-Cyhalothrin	Karate King, Karate Zeon	2	14	1			17	
Abamectin	Apache	9					9	
Clorpirifos	Aurus 48, Chas 48, Clarnet, Clorifos 48 EC, Closar 48, Dursban 48	8					8	
Hexitiazox	Acarelte Plus, Exitox, Jalisco	3					3	
Deltamethrin	Decis expert			1			1	
Thiacloprid	Biscaya			1			1	
Total		22	14	3	0	0	39	
Granules								
Clorpirifos	Barsun 5G, CHAS 5G, Clorifos 5G, Clorpirifos 5G, Closar 5G, Dursban 5G, Fostan 5G	22					22	
Teflutrin	Vigilex	1					1	
Total		23	0	0	0	0	23	
Total		170	89	6	1	11	277	

Table A.4: Explanations for for changed insect and corn borer control practice in MON 810 (Section 3.1)

Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3301	yes	different	regular seed treatment but less one (1) insecticide treatment in the transgenic maize because it wasn´t necessary	no	similar	no statement
Portugal	3302	yes	different	regular seed treatment but less one (1) insecticide treatment in the transgenic maize (GM) because it wasn´t necessary	no	similar	no statement
Portugal	3303	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields
Portugal	3304	yes	different	regular seed treatment but less two (2) insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3305	yes	different	only made the regular insecticide seed treatment in the GM fields. No more insecticide application in GM maize, not necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3306	yes	different	only made the regular insecticide seed treatment, no more insecticide application in the GM maize, not necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3307	yes	different	only regular insecticide seed treatment, No more insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3308	yes	different	only regular insecticide seed treatment, no more insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3309	yes	different	only regular insecticide seed treatment, no more insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3310	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3311	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3312	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3313	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3314	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3315	yes	different	regular seed treatment but less two (2) insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3316	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3317	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3318	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3319	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3320	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3323	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3324	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3325	yes	different	regular seed treatment but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3326	yes	different	only regular insecticide seed, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3327	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3328	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3331	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3332	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3334	yes	different	regular seed treatment, but less insecticide treatments in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3335	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3336	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3337	yes	different	regular seed treatment, but less insecticide treatment in the transgenic maize (GM) because it wasn´t necessary	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3338	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3339	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3340	yes	different	only regular insecticide seed treatment, insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Portugal	3341	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	no	similar	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Portugal	3342	yes	different	only regular insecticide seed treatment, no insecticide application practices in the GM maize because it wasn´t necessary.	yes	different	no treatments for the control of maize borer in the GM fields because it wasn´t necessary
Romania	3353	yes	different	No need for YieldGard	no	similar	I used MON810
Romania	3356	no	different	No seed treatment for conventional	no statement	similar	no statement
Spain	3366	yes	different	YieldGard maize does not need insecticide treatments against ECB but conventional maize must to be treated	yes	different	YieldGard does not need insecticide treatments against ECB but in the conventional maize I apply Clorpirifos 48% against ECB

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Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Spain	3396	yes	different	I apply Clorpirifos 48% against ECB in conventional maize. In YieldGard maize it is not necessary	yes	different	I don´t need to treat YielGard maize against ECB but conventional maize yes, spraying Clorpirifos 48%
Spain	3444	yes	different	I have to treat conventional maize with an insecticide against ECB	yes	different	I have to treat conventional maize with Clorpirifos 48% against ECB.YieldGard maize does not need insecticide treatments
Spain	3454	yes	different	I must to treat conventional maize with an insecticide against ECB	yes	different	I have to treat conventional maize with Clorpirifos 48% against ECB.YieldGard maize does not need insecticide treatments
Spain	3473	yes	different	YieldGard maize does not need insecticide treatments against ECB but conventional maize must to be treated	yes	different	I apply Clorpirifos 48% against ECB in conventional maize but not in YieldGard.

continued from previous page

Country	**Quest. Nr.**	**Insecticides in conv. maize**	**Insect control practice in MON 810**	**Explanation of differences in insect control practice**	**Insecticides against corn borers in conv. maize**	**Corn borer control in MON 810**	**Explanation of differences in insect control practice**
Spain	3475	yes	different	I have to treat conventional maize with an insecticide against ECB	yes	different	I treat with Clorpirifos 48% against ECB in conventional maize but not in YieldGard maize
Czech Republic	3512	yes	different	Didn't use insecticides for ECB in YieldGard	yes	different	Insecticides against ECB only in conventional maize not in YieldGard
Czech Republic	3514	yes	different	YieldGard was not treated	yes	different	YieldGard was not treated
Czech Republic	3515	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3518	yes	different	YieldGard not treated	yes	different	YieldGard not treatred
Czech Republic	3521	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3522	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3524	yes	different	YieldGard not treated	yes	different	ECB does not occur, YieldGard not treated

continued from previous page

Country	Quest. Nr.	Insecticides in conv. maize	Insect control practice in MON 810	Explanation of differences in insect control practice	Insecticides against corn borers in conv. maize	Corn borer control in MON 810	Explanation of differences in insect control practice
Czech Republic	3529	yes	different	no application	yes	different	no application
Czech Republic	3530	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3531	yes	different	YieldGard not treated	yes	different	They did not treat, refugium was to tall
Czech Republic	3534	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3537	yes	different	YieldGard was not treated	yes	different	YieldGard was not treated
Czech Republic	3538	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3539	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Czech Republic	3540	yes	different	YieldGard not treated	yes	different	YieldGard not treated
Poland	3543	yes	different	no needs for ECB control	yes	different	no needs for ECB control
Poland	3548	yes	different	no needs for ECB control	yes	different	no needs for ECB control

Table A.5: Herbicides applied in MON 810 (Section 3.1)

Active	Herbicides as stated by the farmers	Spain	Portugal	Czech Republic	Slovakia	Romania	Poland	Total
Acetochlor, Terbutylazin	Click Plus , Controler Super, Harness GTZ	98			1			99
Nicosulfuron	Chaman, Elite (M, Plus 6 OD), Kelvin 75 WG, Milagro, Mistral, Nic-4 , Nico M, Novapower, Sajon, Samson	65	7	3	2	7	1	85
Mesotrion	Callisto	8	20	7	1	10		46
Atrazin, S-Metolachlor	Primextra (gold)	7	34					41
Acetochlor	Acetocloro 84, Acetogan 900 EC, Acetokey, Guardian (Safe Max), Harness (plus), Nudor Forte	15		7		10	2	34
Fluroxypyr	Starane 20	26						26
Glyphosat	Clinic, Glifosato, Herbolex, Montana, Piton, Roundup (plus, presiembra, transorb, rapid), Tomcato	20	2	1		2		25

continued from previous page

Active	Herbicides as stated by the farmers	Spain	Portugal	Czech Republic	Slovakia	Romania	Poland	Total
Mesotrion, S-Metolachlor	Camix, Lumax	18		4				22
Dicamba	Banvel D	19		1				20
Isoxaflutol	Adengo, Merlin, Spade	8		5	1			14
Foramsulfuron, Iodosulfron-methyl, Isoxadifen-ethyl	MaisTer			6			6	12
Foramsulfuron, Isoxadifen-ethyl	Equip, Option		11			1		12
Bromoxynil	Buctril, Emblem	5	1			4	1	11
Mesotrion, S-Metolachlor, Terbuthylazin	Gardoprim Gold Plus			9				9
Aclonifen, Ixosaflutol	Lagon	8						8
Sulcotrion	Mikado , Sudoku, Zeus	2	6					8
Flufenacet, Terbuthylazin	Aspect		7					7
Rimsulfuron	Principal, Titus			1	1	2	3	7
Acetochlor, Diclormid	Trophy 40 SC	2		3				5
Isoxadifen, Tembotrion	Laudis		4	1				5
Acetochlor, Terbutylazin, Furilazol	Guardian Tetra			1	3			4
Dimethenamid-P	Outlook			4				4
Nicosulfuron, Terbutylazin	Nicoter, Winner Top		4					4

continued from previous page

Active	**Herbicides as stated by the farmers**	**Spain**	**Portugal**	**Czech Republic**	**Slovakia**	**Romania**	**Poland**	**Total**
Pethoxamid, Terbuthylazin	Koban T			4				4
2,4 D	2,4-D, Dicopur, Esteron			1		2		3
Bromoxynil, Terbuthylazin	Zeagran						3	3
Nicosulfuron, Rimsulfuron	Hector			1			2	3
Terbuthylazin	Click, Cuna	2		1				3
2.4D, Florasulam	Mustang	1					1	2
Acetochlor, Terbutylazin	Lanceiro super	2						2
Bentazon	Kaos		2					2
Foramsulfuron	Cubix	2						2
MCPA	Herbimur MCPA	2						2
Pethoxamid	Successor 600			2				2
Acetochlor, Atrazin	Harness GD	1						1
Bentazon, Nicosulfuron	Kelvin pack			1				1
Dimethenamid-P, Pendimethalin	Wing-P			1				1
Linuron	Afalon flow					1		1
Rimsulfuron, Thifensulfuron	Grid			1				1
Total		311	98	65	9	39	19	541

Table A.6: Explanations for earlier/ later harvest of MON 810 (Section 3.1)

Country	Quest. Nr.	Harvest	Comments aggregate	Comments
Czech Republic	3512	earlier	variety (FAO)	Early hybrid FAO, grain purchase buy as first GMO and than conventional maize
Spain	3361	later	plant development, plant health, stay green effect, maturity (water content)	YieldGard maize is greener at the end of their life and I harvest it one week later than conventional because has more humidity
Spain	3432	later	desired flexibility (cropping system, logistics, channeling/ coexistence)	Because I sow YieldGard later than conventional maize and I have to harvest it later too
Czech Republic	3514	later	desired flexibility (cropping system, logistics, channeling/ coexistence)	They harvested GMO maize later, because was harvested as CCM
Czech Republic	3518	later	desired flexibility (cropping system, logistics, channeling/ coexistence)	because we do not mix YG and normal maize
Czech Republic	3524	later	plant development, plant health, stay green effect, maturity (water content)	plants are healthy and mature later
Czech Republic	3530	later	variety (FAO)	higher FAO
Czech Republic	3533	later	plant development, plant health, stay green effect, maturity (water content)	YG had loner vegetation period
Slovakia	3509	later	variety (FAO)	higher FAO
Romania	3353	later	desired flexibility (cropping system, logistics, channeling/ coexistence)	Late harvest (need a separate warehouse)
Poland	3548	later	plant development, plant health, stay green effect, maturity (water content)	delayed maturity of healthy plants
Poland	3549	later	plant development, plant health, stay green effect, maturity (water content)	delayed maturity of healthy plants

Table A.7: Explanations for characteristics of MON 810 different from "as usual" (Section 3.2)

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3361	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard maize is greener, with more humidity and gets maturity one week later than conventional maize
Spain	3362	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize gives more yield because it does not have ECB attacks
Spain	3363	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize does not fall down and produces more than conventional because it has not ECB attack
Spain	3365	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize is resistant to ECB, it has not ECB attacks, it does not fall down and then all yield is harvested
Spain	3366	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize with any ECB damages then the stem does not break, the plant does not fall down and all yield is harvested, 1.000 kilos / hectare more than conventional maize
Spain	3369	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize has not ECB attacks and it does not fall down, giving more kilos than conventional maize

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Spain	3372	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize has not ECB damages and then their stem does not break and their ears does not fall down and all yield is harvested
Spain	3376	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize does not fall down since it is resistant to ECB. YieldGard is healthier and with more humidity and gets maturity later than conventional maize.YieldGard has not ECB damages and gives higher yield than conventional maize
Spain	3378	as usual	as usual	as usual	as usual	as usual	delayed	higher yield	as usual	YieldGard maize maturates a few later than conventional since the plant is healthier, greener, with more humidity, extend their life and gives more kilos than conventional maize since it has not ECB damages
Spain	3380	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize does not fall down since it has any ECB attack, it is healthier and delays a few days the maturity, giving higher yield than conventional maize

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Spain	3382	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize is more productive than conventional maize since it is healthier with any ECB damages
Spain	3384	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize plant is stronger, greener, healthier than conventional maize since it has any ECB damages and then YieldGard produces more yield than conventional maize
Spain	3387	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize is resistant to ECB then the plant does not fall down, the ears does not fall down, all yield is harvested and produces more than conventional maize
Spain	3388	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize gives yield a few higher than conventional maize since it has any ECB damages
Spain	3391	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize gives always a few more of yield than conventional maize with one humidity degree less and with ECB damages

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3392	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard produces always higher yield than conventional maize with one humidity degree less and with ECB damages
Spain	3394	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard is resistant to ECB and it is always more productive than conventional maize with yield losses by ECB damages
Spain	3395	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard maize maturates a few later than conventional maize since YieldGard plant is greener and it has more humidity
Spain	3396	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard has not ECB damages, then their plants does not fall down, the ears does not fall down and gives higher yield than conventional maize with yield losses by ECB attacks
Spain	3398	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize is always healthier, greener and more productive than conventional maize including the seasons with weak ECB attacks
Spain	3405	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize has any ECB damages, it does not fall down and it does not have ear losses, producing more yield than conventional maize

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Spain	3406	as usual	as usual	as usual	as usual	as usual	delayed	higher yield	as usual	YieldGard plant is greener, healthier, with more humidity, it maturates some days later than conventional maize and produces more kilos since it has any ECB damages
Spain	3408	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize is always more productive than conventional maize since it does not have ECB damages
Spain	3409	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize does not fall down since it is resistant to ECB, all yield is harvested and always their yield is higher than conventional maize yield
Spain	3410	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard maize needs more time to get maturity than conventional maize since YieldGard plants are greener, healthier and with more humidity because they does not have ECB damages
Spain	3412	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard plant completes their life with bigger health and humidity than conventional maize plant, getting maturity a few later

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3413	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize does not fall down since it has any ECB damages, the plants are greener, stronger and with more humidity,getting maturity some later and giving higher yield than conventional maize
Spain	3414	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard does not have ECB attack, then the plants and the ears does not fall down, all yield is harvested and there will not be volunteers next season.In the conventional maize happens the opposite
Spain	3416	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard has not yield losses by ECB attacks and the conventional maize has losses yield
Spain	3417	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize does not have ECB attack and there are not ears damaged, the plants are healthier and greener than conventional maize plants, getting maturity some later and giving more production

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Spain	3418	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize plant is stronger, healthier, the stem does not break and the ears does not fall down since it is resistant to ECB, it maturates a few later than conventional maize and it gives more kilos.
Spain	3419	as usual	as usual	as usual	as usual	less often	delayed	as usual	as usual	YieldGard has any ECB damages, the plants does not fall down and need more time to get maturity than conventional maize plants
Spain	3420	as usual	as usual	as usual	as usual	less often	delayed	as usual	as usual	YieldGard maize does not fall down since it is resistant to ECB, the plants are greener, healthier and maturates slower than conventional maize
Spain	3429	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard is healthier, with any ECB damages, the plants and the ears does not fall down and all production is harvested in the case of YieldGard maize but not in the conventional maize case

continued from previous page

Country	**Quest. Nr.**	**Germi- nation**	**Emer- gence**	**Male flower- ing**	**Plant growth**	**Stalk/- root lodging**	**Maturity**	**Yield**	**Volun- teers**	**Comments**
Spain	3430	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard maize is healthier, greener, complete all stages with any ECB damages and gets maturity a few later than conventional maize weakened by ECB attacks
Spain	3432	as usual	as usual	delayed	as usual	less often	delayed	higher yield	as usual	YieldGard maize flowers later, the plants and the ears does not fall down because YielGard is resistant to ECB, the plants are greener, with more humidity and maturates later, all yield is harvested with any losses of production
Spain	3436	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard does not have ECB attacks, the plants and the ears does not fall down, there is any grain losses and all yield is harvested. In the case case of conventional maize it has yield losses by ECB damages.
Spain	3440	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize does not have ECB attack, the stems does not break and the ears does not fall down in the soil and all yield is harvested. Conventional maize has ECB damages giving losses of yield

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Spain	3441	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize plants are healthier, stronger, does not fall down, all grain is harvested with any losses and produces higher yield than conventional maize with ECB damages
Spain	3442	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	YieldGard plants are greener, the grain has more humidity and maturates a few later than conventional maize
Spain	3444	as usual	as usual	as usual	as usual	less often	delayed	higher yield	less often	YieldGard is resistant to ECB, the plants and the ears does not fall down then there will not be volunteers next year, it has more humidity and maturates more slowly and gives higher yield than conventional maize
Spain	3446	as usual	as usual	as usual	as usual	less often	delayed	higher yield	less often	YieldGard maize with any ECB damages, the ears does not fall down, it has more humidity ans delays maturity, all yield is harvested and there will not be volunteers next season. In the conventional maize happens the opposite

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3447	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard gives higher yield than conventional maize because does not have ECB damages, the plants and the ears does not fall,all maize grain is harvested then any volunteers next year in YieldGard fields
Spain	3448	as usual	as usual	as usual	as usual	less often	delayed	higher yield	less often	YieldGard maize healthier, stronger, greener because does not have ECB damages, it does not fall down, it maturates later,it gives higher yield than conventional maize and there is not volunteers next year
Spain	3449	as usual	as usual	as usual	as usual	less often	delayed	higher yield	less often	YieldGard is resistant to ECB attacks, with any damages, then the plants and the ears does not fall down, all grain is harvested and there is not volunteers in YieldGard fields in the next season
Spain	3450	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize healthier, with more humidity, it maturates more slowly, with any ECB damages then the plants and the ears does not fall down, all grain produced is harvested with any losses

continued from previous page

Country	**Quest. Nr.**	**Germination**	**Emergence**	**Male flowering**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volunteers**	**Comments**
Spain	3454	as usual	as usual	as usual	as usual	less often	delayed	higher yield	less often	YieldGard is resistant to ECB and it is healthier, greener, needs more time to dry, does not fall down and all grain produced is harvested with any losses in the soil, in this way next season there will not be volunteers in the YieldGard maize fields
Spain	3457	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard does not fall down and all yield is harvested because it has any ECB damages. Conventional maize has lower production by ECB attacks
Spain	3458	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize always gives more production than conventional, including years with any ECB attacks, because YieldGard has problems of viriasis (MDMV and MRDV) than conventional maize
Spain	3463	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard maize does not have ECB damages and the plants and the seeds (grain) does not fall down in the soil, all produced grain is harvested and there are any volunteers next year

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3464	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard is healthier, with any ECB damages, the plants and the ears does not fall down and all grain is harvested with any losses of yield. Conventional maize fall down by ECB damages and has yield losses
Spain	3465	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard maize with any ECB damages and then the plants and the ears does not fall down and there are any volunteers next year because all yield is harvested with any losses of maize grain in the soil.
Spain	3468	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize.
Spain	3469	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard does not fall down since it is resistant to ECB and all produced grain is harvested. In the conventional maize with ECB damages a part of the produced grain stay in the soil and it is not harvested.

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Spain	3470	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard maize does not have ECB damages, the plants and the ears does not fall down, in this way all yield is harvested and there are not volunteers next year.
Spain	3473	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize healthier, with any ECB damages, the stem does not break, the ears does not fall down and all grain is harvested with any losses of yield.
Spain	3475	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	YieldGard maize does not have ECB damages and it needs more time to get maturity (2 or 3 days more) than conventional maize,the plants and the ears does not fall down and all grain produced is harvested with any losses of yield.
Spain	3477	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	YieldGard maize healthier, without ECB damages, gets maturity 10 or 12 days later than conventional maize.

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Spain	3479	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize does not have ECB damages, it does not fall down, all yield is harvested because any maize grain fall down in the soil. Conventional maize produces less yield because has ECB damages.
Spain	3480	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard is resistant to ECB and then the plants and the ears does not fall down and all yield is harvested; in conventional maize happens the opposite.
Spain	3484	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize healthier, stronger, with any ECB damages, the stem does not break, the ears does not fall down on the soil,the grain is not damaged and all yield is harvested with any losses.
Spain	3487	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard maize does not have ECB damages, the plants and the ears does not fall down, all produced grain is harvested and in this way there will not be volunteers in the YieldGard fields next season.

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Spain	3491	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize is greener, healthier, with any ECB damages, finishing their life better, the plants does not fall down, it has ears with any damages and the yield gives more kilos than conventional maize.
Spain	3497	as usual	as usual	as usual	as usual	less often	as usual	as usual	as usual	YieldGard has any ECB damages and it does not fall down; conventional maize plants are weakened by ECB and they fall down.
Spain	3498	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YieldGard maize is healthier, with any ECB damages, the plants and the ears does not fall down, all yield is harvested;the conventional maize has losses of yield by ECB damages.
Spain	3500	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	YieldGard does not have ECB damages, it does not fall down, the ears are com-pletes, the grains does not fall down on the soil and then there will not be volun-teers next season and it does not have losses of yield.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Spain	3502	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard always produces a few more than conventional maize, including seasons like this year with weak ECB attack.
Spain	3503	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard maize is healthier and always produces a few more yield than conventional maize, including years like this last season with weak ECB attack.
Spain	3504	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YieldGard plants are greener, healthier, without ECB damages, they complete better their life and gives higher yield than conventional maize.
Spain	3506	as usual	as usual	delayed	as usual	as usual	delayed	as usual	as usual	YieldGard maize delays some days the flowering, it is healthier, more vigorous, with more humidity (one degree more in the harvest) and it maturates a few days later than conventional maize.
Portugal	3301	more vigorous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 64 000 kg/ha in the transgenic maize, forage maize, were similar compared with the conventional maize.Greater germination vigor, vigorous and strong GM plants.

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Portugal	3302	more vigor-ous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 500 kg/ha in the transgenic (GM) maize, dry maize, and the average yields of 65 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conven-tional maize. Greater germination vigor, vigorous and strong GM plants.
Portugal	3303	more vigor-ous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	Greater germination vigor, vigorous and strong GM plants. The average yields of 12 000 kg/ha in the transgenic (GM) maize, drymaize, and the average yields of 60 000 kg/ha in the transgenic (GM) maize, forage maize, were similar com-pared with the maize. Environmental fac-tors (soils and climates) and different va-rieties affect more than any real type of maize planted(conventional or trans-genic GMO).

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3304	more vigorous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 500 kg/ha in the transgenic (GM) maize, dry maize, and the average yields of 60 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. Greater germination vigor, vigorous and strong GM plants.
Portugal	3305	more vigorous	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 11 000 kg/ha in the transgenic maize (GM), dry maize, an average of 1000 kg/ha higher compared with conventional maize. Greater germination vigor, vigorous and strong GM plants. Environmental factors (soils and climates) and different varieties of maize affect more than any real type of maize planted (conventional or transgenic GMO).

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Portugal	3306	more vigor-ous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 13 500 kg/ha in the transgenic (GM) maize, dry maize, and the average yields of 70 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. Greater germination vigor, vigorous and strong GM plants, best quality of the maize.
Portugal	3307	more vigor-ous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 10 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conven-tional maize.Environmental factors (soils and climates) and different varieties of maize affect more than any real type of maize planted.Greater germination vigor, vigorous and strong GM plants.
Portugal	3308	more vigor-ous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 57 500 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conven-tional maize. Greater germination vigor, vigorous and strong GM plants.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3309	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 50 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. Environmental factors (soils and climates) and different varieties of maize affect more than any real type of maize planted.
Portugal	3310	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 13 500 kg/ha in the transgenic maize (GM), dry maize, an average of 300-500 kg/ha higher compared with conventional maize. The field characteristics are very similar between the GM maize and the conventional maize.
Portugal	3311	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 11 100 kg/ha in the transgenic maize (GM), dry maize, an average of 250-500 kg/ha higher compared with conventional maize.
Portugal	3312	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 13 500 kg/ha in the transgenic maize (GM), dry maize, an average of 500 kg/ha higher compared with conventional maize. Slight increase in productivity in GM maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3313	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 10 900 kg/ha in the transgenic maize (GM), dry maize, an average of 1000 kg/ha higher compared with conventional maize. The others field characteristics are very similar between the GM maize and the conventional maize.
Portugal	3314	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 13 800 kg/ha in the transgenic maize (GM), dry maize, an average of 500 kg/ha higher compared with conventional maize. Slight increase in productivity in GM maize.
Portugal	3315	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 15 800 kg/ha in the transgenic maize (GM), dry maize, an average of 1000 kg/ha higher compared with conventional maize. The others field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3316	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 15 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3317	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 11 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3318	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 16 500 kg/ha in the transgenic maize (GM), dry maize, an average of 800-1000 kg/ha higher compared with conventional maize. The others field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3319	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3320	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 55 000 kg/ha in the transgenic maize (GM), forage maize, an average of 3500 kg/ha higher compared with conventional maize. The others field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3321	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 500 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3322	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 13 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3323	more vigorous	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 14 500 kg/ha in the transgenic maize (GM), dry maize, an average of 500-600 kg/ha higher compared with conventional maize. Greater germination vigor, vigorous and strong GM plants.
Portugal	3324	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 15 000 kg/ha in the transgenic maize (GM), dry maize, an average of 500 kg/ha higher compared with conventional maize. Slight increase in productivity in GM maize.
Portugal	3325	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 15 000 kg/ha in the transgenic maize (GM), dry maize, an average of 500-750 kg/ha higher compared with conventional maize. Slight increase in productivity in GM maize.

continued from previous page

Country	**Quest. Nr.**	**Germination**	**Emergence**	**Male flowering**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volunteers**	**Comments**
Portugal	3326	more vigorous	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	Greater germination vigor, vigorous and strong GM plants. The average yields of 12 000 kg/ha in the transgenic maize (GM),dry maize, an average of 1500 kg/ha higher compared with conventional maize.
Portugal	3327	more vigorous	as usual	as usual	as usual	as usual	as usual	as usual	as usual	Greater germination vigor, vigorous and strong GM plants. The average yields of 60 000 kg/ha in the transgenic (GM) maize,forage maize, were similar compared with the conventional maize.
Portugal	3328	more vigorous	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 14 000 kg/ha in the transgenic maize (GM), dry maize, an average of 1000-1500 kg/ha higher compared with conventional maize. Greater germination vigor, vigorous and strong GM plants.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3329	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 13 500 kg/ha in the transgenic maize (GM), dry maize, an average of 1000-1500 kg/ha higher compared with conventional maize. The others field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3330	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 14 000 kg/ha in the transgenic (GM) maize, dry maize.
Portugal	3331	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	**Quest. Nr.**	**Germination**	**Emergence**	**Male flowering**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volunteers**	**Comments**
Portugal	3332	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	The average yields of 16 000 kg/ha in the transgenic maize (GM), dry maize, an average of 500-1000 kg/ha higher compared with conventional maize. Significant increases in GM maize yields. The others field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3333	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 11 000 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.The field characteristics are exactly equal between the GM maize and the conventional maize. The maize varieties and cycles,the different cultivation techniques and the environmental factors (soils and climates) affect more than any real type of maize planted (GM or conventional).

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Portugal	3334	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 12 500 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conventional maize.
Portugal	3335	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	An average of 500-1000 kg/ha higher in GM maize yields, dry maize, compared with conventional maize. Increases in GM maize yields, dry maize, compared with conventional maize. Increases in GM maize yields.
Portugal	3336	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 11 500 kg/ha in the transgenic (GM) maize, dry maize, were similar compared with the conven-tional maize.The field characteristics are exactly similar between the GM maize and the conventional maize.
Portugal	3337	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 80 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conven-tional maize. The field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3338	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 55 000 - 60 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3339	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 70 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. The field characteristics are exactly equal between the GM maize and the conventional maize.
Portugal	3340	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 65 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. The field characteristics are exactly equal between the GM maize and the conventional maize.

continued from previous page

Country	Quest. Nr.	Germination	Emergence	Male flowering	Plant growth	Stalk/-root lodging	Maturity	Yield	Volunteers	Comments
Portugal	3341	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	The average yields of 65 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize. Nothing to report about the differences in agronomic behaviour.
Portugal	3342	as usual	as usual	as usual	as usual	as usual	as usual	as usual	as usual	Perfectly normal. The average yields of 75 000 kg/ha in the transgenic (GM) maize, forage maize, were similar compared with the conventional maize.
Czech Republic	3512	as usual	as usual	as usual	as usual	less often	as usual	higher yield	less often	Maize is healthier. The plants are not attacked by ECB and there is less level of fungal disease
Czech Republic	3513	as usual	as usual	delayed	delayed	as usual	delayed	higher yield	as usual	Maize is more healthy. The plants are not attacked by ECB and there is less level of fungal diseases
Czech Republic	3514	as usual	accelerated	as usual	as usual	as usual	as usual	higher yield	as usual	shorter germination - not due to hybrid, but better soil preparation and soil moisture Higher yield - GMO maize harvested to silage, then CMM and to grain

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Czech Republic	3515	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	higher yield - they sowed more seeds, about 5000/ha, according those uncom-mon lodging - to much wildlife around the field, wild boars are less this year
Czech Republic	3516	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	no state-ment	healthy plants
Czech Republic	3517	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	no state-ment	GMO more healthy, conventional prema-ture, conventional only as refuge
Czech Republic	3518	as usual	as usual	as usual	as usual	as usual	as usual	as usual	less often	we didn't see it because it comes later
Czech Republic	3519	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	healthier plants, less plant pests, less taste for wildlife
Czech Republic	3521	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	ECB does not damage the maize
Czech Republic	3522	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	healthy plants
Czech Republic	3524	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	plants do not fall down, because thy are healthy and not attacked by ECB

continued from previous page

Country	**Quest. Nr.**	**Germi-nation**	**Emer-gence**	**Male flower-ing**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volun-teers**	**Comments**
Czech Republic	3527	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	YG is healthy and less attacked by diseases and pests
Czech Republic	3528	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	no state-ment	better health conditions of the plant
Czech Republic	3531	as usual	as usual	as usual	as usual	less often	as usual	as usual	as usual	The plants are healthy
Czech Republic	3532	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	no attack of ECB
Czech Republic	3534	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	the plants are healthy
Czech Republic	3535	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	plants do not break down, are healthier and not attacked by ECB
Czech Republic	3536	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YG was not attacked by ECB
Czech Republic	3538	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	YG gives higher yield than conventional hybrids, because the plants are healthy
Czech Republic	3539	as usual	as usual	as usual	as usual	as usual	delayed	higher yield	less often	YG matures later and has higher yield, because the plant are healthy and has no damage by ECB

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Czech Republic	3540	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	healthier plants and no attack of ECB
Slovakia	3509	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	less often	For both: the plants are more healthy
Slovakia	3510	as usual	as usual	as usual	as usual	less often	as usual	as usual	less often	The plants were mor healthy
Slovakia	3511	as usual	as usual	as usual	delayed	less often	delayed	higher yield	as usual	My opinion was, that the plants were healthy (prevention), and the vegetation period was longer because the maturity was longer.The plants were healthy, didn't break and so the yield was higher
Romania	3344	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	> 400 kg/ha
Romania	3348	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	> 500 kg/ha
Romania	3349	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	+ 655 kg/ha
Romania	3350	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	+ 634 kg / ha
Romania	3351	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	+ 378 kg/ha

continued from previous page

Country	Quest. Nr.	Germi-nation	Emer-gence	Male flower-ing	Plant growth	Stalk/-root lodging	Maturity	Yield	Volun-teers	Comments
Romania	3352	as usual	as usual	as usual	as usual	less often	as usual	higher yield	no state-ment	higher yield than conventional due to breakage less often
Romania	3353	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	higher yield than conventional due to breakage less often and lack of Ostrinia attack
Romania	3354	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	higher yield than conventional due lack of Ostrinia attack
Romania	3356	as usual	as usual	as usual	as usual	less often	as usual	higher yield	as usual	higher yield than conventional due lack of Ostrinia attack
Romania	3357	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	higher yield than conventional due lack of Ostrinia attack
Poland	3541	more vigor-ous	as usual	delayed	accel-erated	less often	delayed	as usual	as usual	More vigorous germination - don't know, delayed time to male flowering - later variety, accelerated plant growth and development- don't know, less lodging - healthier plants, no damage fro ECB, de-layed maturity - no ECB damage, later variety
Poland	3542	as usual	as usual	as usual	as usual	as usual	as usual	higher yield	as usual	higher yield - no damage from ECB

continued from previous page

Country	**Quest. Nr.**	**Germination**	**Emergence**	**Male flowering**	**Plant growth**	**Stalk/-root lodging**	**Maturity**	**Yield**	**Volunteers**	**Comments**
Poland	3544	as usual	as usual	as usual	as usual	as usual	delayed	as usual	as usual	delayed maturity - healthier plants, no damage from ECB
Poland	3548	more vigorous	accelerated	delayed	accelerated	less often	delayed	as usual	as usual	More vigorous germination- don't know, accelerated time to germination - don't know, delayed time to male flowering - don't know, accelerated plant growth and development - don't know, less lodging - no damages from ECB, healthier plants, delayed maturity - don't know
Poland	3549	as usual	as usual	as usual	as usual	less often	delayed	higher yield	as usual	less lodging - no damage from ECB, healthier plants, delayed maturity - healthier plants, higher yield - no damage from ECB

Table A.8: Additional observation during plant growth (Section 3.2)

Country	Quest. Nr.	Additional observations during plant growth
Spain	3366	YieldGard maize looks healthier, greener, stronger than conventional maize
Spain	3404	This year has been a "good year" to grow maize with any ECB, with any virosis and then there are any differences between YieldGard and conventional maize
Spain	3407	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3411	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3415	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3418	YieldGard maize looks in all stages healthier and the grain has more humidity in the harvest than conventional maize grain
Spain	3428	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3433	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize
Spain	3437	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize
Spain	3439	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3449	YieldGard maize greener, with more humidity than conventional maize and it needs a few days more to get maturity
Spain	3458	YieldGard has less viriasis problems than conventional maize
Spain	3459	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3474	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize
Spain	3481	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3482	When there are not ECB attacks, like this year, there are any differences between YieldGard and conventional maize
Spain	3489	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize
Spain	3490	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize
Spain	3508	This season did not have ECB attacks and then there are not differences between YieldGard and conventional maize

Table A.9: Additional comments on disease susceptibility (Section 3.3)

Country	Quest. Nr.	Disease susceptibility	Comments
Portugal	3310	as usual	no differences on diseases susceptibility between the GM maize and the conventional maize
Portugal	3316	as usual	Perfectly normal. There are no differences on diseases susceptibility between the GM maize and the conventional maize
Portugal	3318	as usual	There are no differences on diseases susceptibility between the GM maize and the conventional maize. Perfectly normal and equal.
Portugal	3332	as usual	Perfectly normal. There are no differences on diseases susceptibility between the GM maize and the conventional maize
Portugal	3333	as usual	Perfectly normal. There are no differences on diseases susceptibility between the GM maize and the conventional maize
Portugal	3337	as usual	There are no differences on diseases susceptibility between the GM maize and the conventional maize. Perfectly normal and similar.
Portugal	3340	as usual	There are no differences on diseases susceptibility between the GM maize and the conventional maize.
Portugal	3341	as usual	Perfectly normal. The region had small / low incidence of diseases. In fact was very difficult for the farmer to record assessments.
Spain	3429	less susceptible	YieldGard maize healthier and it has less diseases problems than conventional maize. YieldGard maize has any ECB damages, it is healthier and it is has less diseases problems than conventional maize weakened by ECB attacks.
Spain	3458	less susceptible	YieldGard maize has less viruses problems than conventional maize. For every 10 YieldGard plants, 3 had viruses problems.For every 10 conventional maize plants, 5 had viruses problems.
Portugal	3301	less susceptible	The superior sanity of GM maize makes GM plants more resistant to the attack by the different diseases (less susceptible).
Portugal	3302	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases

continued from previous page

Country	Quest. Nr.	Disease susceptibility	Comments
Portugal	3305	less susceptible	Strong presence in the region in study of "Helminthosporium". The environmental factors (soils and climates) were also important in the impact of diseases in the fields. The largest sanity of GM maize makes plants more resistant to the diseases
Portugal	3306	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases
Portugal	3307	less susceptible	Strong presence in the region in study of "Helminthosporium". The superior sanity of GM maize makes plants more resistant to the diseases
Portugal	3308	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases
Portugal	3309	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases.
Portugal	3311	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases.
Portugal	3312	less susceptible	The sanity and health of GM maize is higher and spectacular and makes GM plants more resistant to the attack by the different diseases
Portugal	3313	less susceptible	The superior sanity of GM maize makes GM plants more resistant to the attack by the different diseases.
Portugal	3314	less susceptible	Intense and strong presence in the region in study of "Cefalosporium spp". The superior sanity of GM maize makes plants more resistant to the diseases.
Portugal	3315	less susceptible	The sanity and health of GM maize is higher and spectacular and makes GM plants clearly more resistant to the attack by the different diseases
Portugal	3321	less susceptible	The largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases. However the region had small / low incidence of diseases. In fact was very difficult for the farmer to record assessments.
Portugal	3323	less susceptible	The superior sanity of GM maize makes GM plants more resistant to the attack by the different diseases
Portugal	3324	less susceptible	Better sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases

continued from previous page

Country	Quest. Nr.	Disease susceptibility	Comments
Portugal	3326	less susceptible	The sanity and health of GM maize in higher and spectacular and makes GM plants clearly more resistant to the attack by the different diseases
Portugal	3327	less susceptible	The region had small / low incidence of diseases. In fact was very difficult for the farmer to record assessments. However the largest sanity and health of GM maize makes GM plants more resistant to the attack by the different diseases.
Portugal	3328	less susceptible	The sanity and health of GM maize is higher and spectacular and makes GM plants clearly more resistant to the attack by the different diseases
Portugal	3342	less susceptible	The sanity of GM maize is higher and makes GM plants more resistant to the attack by the different diseases
Czech Republic	3524	less susceptible	healthy plants are not attacked by corn borer, because they have no openings for entry of fungal diseases, they are healthy

Table A.10: Additional comments on insect pest control (Section 3.4)

Country	Quest. Nr.	*Ostrinia nubilalis*	*Sesamia spp.*	Comments
Portugal	3303	very good	very good	Amazing and fantastic results, almost perfect effectiveness in the control of maize borer in GM fields.
Portugal	3305	very good	very good	Almost perfect effectiveness in the control of maize borer in GM fields.
Portugal	3306	very good	very good	Amazing and excellent results in the control of maize borer in GM fields.
Portugal	3308	very good	very good	Almost perfect and total effectiveness in the control of maize borer in GM fields.
Portugal	3310	very good	very good	Amazing and fantastic results, almost perfect effectiveness in the control of maize borer in GM fields.
Portugal	3311	very good	very good	Amazing and excellent results in the control of maize borer in GM fields.
Portugal	3312	very good	very good	Almost perfect and total effectiveness in the control of maize borer in GM fields.
Portugal	3313	very good	very good	Almost Total effectiveness in the control of maize borer in GM fields.
Portugal	3316	very good	very good	Total effectiveness in the control of maize borer in GM fields.
Portugal	3320	very good	very good	Amazing and excellent results in the control of maize borer in GM fields.
Portugal	3321	very good	very good	Amazing and spectacular results in the control of maize borer in GM fields.
Portugal	3324	very good	very good	Total effectiveness in the control of maize borer in GM fields (almost 100%).
Portugal	3325	very good	very good	Almost 100% of effectiveness in the control of maize borer in GM fields.
Portugal	3326	very good	very good	Amazing and excellent results in the control of maize borer in GM fields. Almost 100% of effectiveness in the control of maize borer in GM fields.
Portugal	3328	very good	very good	Almost 100% of effectiveness in the control of maize borer in GM fields.
Portugal	3329	very good	very good	Fantastic and excellent results in the control of maize borer in GM fields.

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Country	**Quest. Nr.**	***Ostrinia nubilalis***	***Sesamia spp.***	**Comments**
Portugal	3330	very good	very good	Total effectiveness in the control of maize borer in GM fields.
Portugal	3331	very good	very good	Fantastic and excellent results in the control of maize borer in GM fields. Total control of maize borer in GM fields.
Portugal	3332	very good	very good	Amazing and excellent results in the control of maize borer in GM fields. Almost 100% of effectiveness in the control of maize borer in GM fields.
Portugal	3333	very good	very good	Total effectiveness in the control of maize borer in GM fields.
Portugal	3335	very good	very good	Very good effectiveness in the control of maize borer in GM fields.
Portugal	3337	very good	very good	Fantastic and excellent results in the control of maize borer in GM fields. Total control of maize borer in GM fields.
Portugal	3338	very good	very good	Almost 100% of effectiveness in the control of maize borer in GM fields.
Portugal	3339	very good	very good	Total effectiveness in the control of maize borer in GM fields.
Portugal	3341	very good	very good	Almost 100% of effectiveness in the control of maize borer in GM fields.
Romania	3353	very good	no statement	very good control on ECB and therefore higher yield

Table A.11: Additional comments on pest susceptibility (Section 3.5)

Country	Quest. Nr.	Pest susceptibility	Order of insect pest	Comments
Portugal	3340	as usual		There are no differences on other pests susceptibility between the GM maize and the conventional maize.
Portugal	3341	as usual		Perfectly normal. The region of production had a lower and smaller incidence of pests. In fact was very difficult for the farmer to record assessments.
Spain	3396	less susceptible	Lepidoptera	Mitima and Heliothis attacks conventional maize but not YieldGard maize
Spain	3408	less susceptible	Arachnida, Diptera	YieldGard maize is less attacked by Red Spider and Mosquito than conventional maize
Spain	3429	less susceptible	Arachnida, Diptera	YieldGard maize healthier, without ECB damages, has less intense attacks from other insects than conventional maize with ECB damages and more weak
Portugal	3301	less susceptible	Lepidoptera	The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests. Best health and sanity of GM maize make GM plants less susceptible to other pests.
Portugal	3302	less susceptible	Lepidoptera	The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3303	less susceptible	Lepidoptera	The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3304	less susceptible	Lepidoptera	The superior sanity of GM maize makes GM plants more resistant to the attack by the different other pests
Portugal	3305	less susceptible	Lepidoptera	The superior and largest sanity of GM maize makes GM plants more resistant to the attack by the different other pests

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Country	Quest. Nr.	Pest susceptibility	Order of insect pest	Comments
Portugal	3306	less susceptible	Lepidoptera	The superior sanity of GM maize makes GM plants more resistant to the attack by the different other pests
Portugal	3307	less susceptible	Arachnida, Lepidoptera	The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3308	less susceptible	Arachnida, Lepidoptera	The superior sanity of GM maize makes GM plants more resistant to the attack by the different other pests
Portugal	3309	less susceptible	Arachnida, Lepidoptera	The GM maize is more resistant to the attack of the different other pests (less susceptible to other pests) because their natural superior sanity.
Portugal	3310	less susceptible	Coleoptera, Lepidoptera	Best health and sanity of GM maize make GM plants less susceptible to other pests. The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3311	less susceptible	Coleoptera, Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3312	less susceptible	Lepidoptera	The GM plant is less worn by the attack of the maize borer. The GM maize is more resistant to the attack of the different other pests (less susceptible to other pests) because their natural superior sanity.
Portugal	3313	less susceptible	Coleoptera, Lepidoptera	no statement
Portugal	3314	less susceptible	Arachnida	no statement

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Country	Quest. Nr.	Pest susceptibility	Order of insect pest	Comments
Portugal	3315	less susceptible	Lepidoptera	The "Agrotis Ipsilon" also attacks the GM maize but with less intensity. The GM maize is more resistant to the attack of the different other pests (less susceptible to other pests) because their natural superior sanity.
Portugal	3316	less susceptible	Arachnida	The "Tetranychus Urticae" also attacks the GM maize but with less intensity compared with the conventional maize
Portugal	3317	less susceptible	Lepidoptera	The "Heliothis Zea" also attacks the GM maize but with less intensity compared with the conventional maize.
Portugal	3318	less susceptible	Arachnida, Lepidoptera	The important fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3319	less susceptible	Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3320	less susceptible	Lepidoptera	Best health and sanity of GM maize make GM plants natural less susceptible to other pests.
Portugal	3321	less susceptible	Lepidoptera	Best health and sanity of GM maize make GM plants natural less susceptible to other pests. However the region had small / low incidence of pests. In fact was very difficult for the farmer to record assessments.
Portugal	3322	less susceptible	Coleoptera, Lepidoptera	The region had small / low incidence of pests attacks. In fact was very difficult for the farmer to record assessments. However the better sanity of GM maize make GM plants natural more resistant to other pests.
Portugal	3323	less susceptible	Lepidoptera	no statement

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Country	Quest. Nr.	Pest susceptibility	Order of insect pest	Comments
Portugal	3324	less susceptible	Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3325	less susceptible	Lepidoptera	Best health and sanity of GM maize make GM plants less susceptible to other pests. The simple fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests
Portugal	3326	less susceptible	Arachnida, Lepidoptera	Fewer "Gateways" (Input ports) in GM fields causing more protection against the attack of other kinds of pests.The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3327	less susceptible	Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3328	less susceptible	Lepidoptera	The GM plant is less worn by the attack of the maize borer. The GM maize is more resistant to the attack of the different other pests (less susceptible to other pests) because their natural superior sanity.
Portugal	3329	less susceptible	Lepidoptera, Coleoptera	The region had a low incidence of pests attacks. In fact was very difficult for the farmer to record assessments. However the better sanity of GM maize make GM plants natural more resistant to other pests.
Portugal	3330	less susceptible	Lepidoptera	The "Agrotis Ipsilon" and the "Heliothis Zea" also attack the GM maize but with less intensity. The GM maize is more resistant to the attack of the different other pests

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Country	Quest. Nr.	Pest susceptibility	Order of insect pest	Comments
Portugal	3331	less susceptible	Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally and indirectly more protected against the attack of other pests.
Portugal	3332	less susceptible	Lepidoptera	The quality of GM maize is clearly higher compared with the conventional maize. The GM plant is less worn by the attack of the maize borer. The GM maize is more resistant to the attack of the different other pests (less susceptible to other pests) because their resistance to the maize borer.
Portugal	3333	less susceptible	Lepidoptera	The fact that the GM maize almost total controls the different attacks of maize borer makes GM plants indirectly more protected against the attack of other pests.
Portugal	3335	less susceptible	Coleoptera, Lepidoptera	The important fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3336	less susceptible	Lepidoptera	The region had a small incidence of pests attacks. In fact was very difficult for the farmer to record assessments. However the fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3337	less susceptible	Lepidoptera	The important fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.
Portugal	3338	less susceptible	Lepidoptera	The region had a small and lower incidence of pests attacks. However the fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests.

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Country	**Quest. Nr.**	**Pest susceptibility**	**Order of insect pest**	**Comments**
Portugal	3339	less susceptible	Lepidoptera	The region had a small and lower incidence of pests attacks. However the fact that the GM maize almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests. It was very difficult for the farmer to record assessments.
Portugal	3342	less susceptible	Lepidoptera	no statement
Czech Republic	3527	less susceptible		general healthier
Slovakia	3509	less susceptible		in general

Table A.12: Additional comments on weed pressure (Section 3.6)

Country	Quest. Nr.	Weed pressure	Comments
Portugal	3301	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize. The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type (GM maize or conventional) of maize planted.
Portugal	3302	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize.
Portugal	3305	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize. The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type (GM maize or conventional) of maize planted.
Portugal	3306	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3307	as usual	The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type (GM maize or conventional) of maize planted.
Portugal	3308	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3312	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize. Perfectly normal
Portugal	3313	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3314	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize. The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type of maize planted.
Portugal	3318	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize. Perfectly normal.

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Country	Quest. Nr.	Weed pressure	Comments
Portugal	3323	as usual	Perfectly normal. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3324	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize. Perfectly normal.
Portugal	3325	as usual	Perfectly equal and normal. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3327	as usual	Nothing to report. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3328	as usual	Perfectly equal and normal. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize. Nothing to report.
Portugal	3330	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize. The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type (GM maize or conventional)of maize planted.
Portugal	3331	as usual	The pressure of weeds depends on the region (soils and climates), on the planting techniques and not from the type (GM maize or conventional) of maize planted.
Portugal	3332	as usual	Perfectly similar. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize. Nothing to report.
Portugal	3333	as usual	Nothing to report. The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize.
Portugal	3337	as usual	The occurrence of weeds was exactly the same between the plots of GM maize and the plots of conventional maize.
Portugal	3339	as usual	The occurrence of weeds was exactly the same and was perfectly normal between the plots of GM maize and the plots of conventional maize

Table A.13: Weeds that occurred in MON 810 (Section 3.6)

Name of weed	Frequency
Sorghum halapense	95
Abutilon theophrasti	94
Chenopodium spp.	88
Setaria ssp.	82
Echinocloa spp.	77
Amaranthus spp.	74
Datura stramonium	52
Cyperus spp.	29
Xanthium spp.	23
Cirsium ssp.	20
Solanum nigrum	19
Agropyron repens	10
Phragmites australis	10
Polygonum spp.	8
Raphanus raphanistrum	7
Atriplex ssp.	6
Galium spp.	6
Portulaca oleracea	6
Digitaria sanguinalis	4
Convolvulus arvense	3
Matricaria ssp.	3
Avena fatua	2
Lolium ssp.	2
rape volunteer	2
cereal volunteers	1
Cynodon dactylon	1
Equisetum arvense	1
Fagopyrum ssp.	1
Fumaria officinalis	1
Galinsoga ssp.	1
Hordeum vulgare	1
Medicago sativa (volunteers)	1
Rubus spp.	1
Salsola kali	1
Thlaspi arvense	1
Veronica	1

Table A.14: Specifications on the occurrence of insects (section 3.7)

Country	Quest. Nr.	Occurrence of insects	Specification
Czech Republic	3518	more	in autumn more aphids, be cause of no treatment
Czech Republic	3524	less	healthy plants are involved
Poland	3548	less	less insects

Table A.15: Specifications on the occurrence of birds (section 3.7)

Country	Quest. Nr.	Occurrence of insects	Specification
Portugal	3321	less	Lower occurrence of Crows and Herons. Didn´t know the main reasons for those facts.

Table A.16: Specifications on the occurrence of mammals (section 3.7)

Country	Quest. Nr.	Occurrence of mammals	Specification
Portugal	3321	less	Lower occurrence of Boars. Didn´t know the main reasons for those facts.
Poland	3544	more	greater number of deer

Table A.17: Specifications of the performance of animals fed MON 810 (section 3.8)

Country	Quest. Nr.	Performance of animals	Specification
Portugal	3304	as usual	The growth and development of animals fed with GM maize were perfectly normal and exactly equal to what happens with the mainalimentacion with the conventional maize.
Portugal	3306	as usual	The growth and development of animals fed with GM maize were perfectly normal and exactly equal to what happens with the mainalimentacion with the conventional maize.
Portugal	3309	as usual	Nothing to report in the growth and development of animals fed with GM maize.
Portugal	3337	as usual	The growth and development of animals fed with GM maize were perfectly normal and exactly equal to what happens with the mainalimentacion with the conventional maize. Didn´t have any negative effects to refere or to indicate, were perfectly normal andwere exactly equal to what happens with the main alimentacion with the conventional maize.
Czech Republic	3516	different	Dairy cows are healthy, pregnancy is better, mor milk, because there aren't mycotoxins in the food, because of absence of ECB
Czech Republic	3524	different	animals are healthier
Czech Republic	3528	different	healthy food for animals
Czech Republic	3534	different	less mycotoxins in food for animals

Table A.18: Additional remarks or observations (section 3.9)

Country	Quest. Nr.	Additional remarks
Portugal	3301	The maize varieties and cycles, the different cultivation techniques and the environmental factors (soils and climates) affect more than any real type of maize planted (transgenic or conventional). The influences and the politician decisions about the possibility of planting certain GMO events are causing serious problems to the Portuguese farmers speaking about the technological level of biodiversity.
Portugal	3302	An important and significant reduction in the use of quantities of pesticides in GM maize contributed to lower costs with plant protection products (insecticides, pesticides...) reducing the economical risks of production.
Portugal	3303	An important and significant reduction in the use of quantities of pesticides in GM maize contributed to lower costs with plant protection products (insecticides, pesticides...) reducing the economical risks of production GM maize.
Portugal	3304	Greater economic profitability in the production of GM maize. Best production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize
Portugal	3305	The GM plants and the GM fields are synonymous of "best production safety". The safety production and the natural reducing of the production risks influence farmers to choose the GM maize. Inconsistency and Injustice of the politician decisions are causing serious problems to the Portuguese farmers speaking about the technological level of other biodiversity GMO events.
Portugal	3307	Better production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize. Greater resistance by the GM plants to adverse environmental conditions.
Portugal	3308	Good quality of the forage GM maize. Better production safety in GM maize.

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Country	Quest. Nr.	Additional remarks
Portugal	3310	The maize varieties and cycles, the different cultivation techniques and the environmental factors (soils and climates) affect more than any real type of maize planted (transgenic or conventional). Areas where the maize borer and the other pests do not attack to much, do not worth economically producing transgenic maize. However the GM plants and the GM fields are synonymous of "best production safety". The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3311	GM plants and the GM fields are synonymous of "best production safety". An important and significant reduction in the use of quantities of pesticides in GM maize contributed to lower costs with plant protection products (insecticides, pesticides...)reducing the economical risks of production GM maize and also contributed to better environmental protection and protection of animal life in soils.
Portugal	3312	An important and significant reduction in the use of quantities of pesticides in GM maize contributed to better environmental protection and protection of animal life in soils. Better production safety in GM maize.
Portugal	3313	Inconsistency and Injustice of the politician decisions are causing serious problems to the Portuguese farmers speaking about the technological level of other biodiversity GMO events. When other "events" become allowed in Portugal will be much more producers of transgenic (GM) maize.
Portugal	3314	An important and significant reduction in the use of quantities of pesticides in GM maize contributed to lower costs with plant protection products (insecticides, pesticides...) reducing the economical risks of production GM maize. The fact that the GM almost total controls the different attacks of maize borer makes GM plants naturally more protected against the attack of other pests and diseases.
Portugal	3315	Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3316	Better environmental protection by an important and significant reduction in the use of quantities of pesticides in GM maize.Higher production safety in GM maize.

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Country	Quest. Nr.	Additional remarks
Portugal	3317	Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize. Reduction in the use of quantities of pesticides in GM maize contributed to better environmental protection and protection of animal life in soils.
Portugal	3318	Higher and better production safety in GM maize. Reduction in the use of quantities of pesticides in GM maize contributed to better environmental protection and protection of animal life in soils.
Portugal	3319	Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3321	The maize varieties and cycles, the different cultivation techniques and the environmental factors (soils and climates)affect more than any real type of maize planted (transgenic or conventional). Inconsistency and Injustice of the politican decisions are causing serious problems to the Portuguese farmers speaking about the technological level of other biodiversity GMO events.
Portugal	3322	The different cultivation techniques, the environmental factors (soils and climates) and the maize varieties and cycles, affect more than any real type of maize planted (transgenic or conventional). Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3323	Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize. Inconsistency and Injustice of the politician decisions are causing serious problems to the portuguese farmers speaking about the technological level of other biodiversity GMO events.
Portugal	3324	GM maize and the GM fields are synonymous of "best production safety". An important and significant reduction in the use of quantities of pesticides in GM maize contributed to better environmental protection and protection of animal life in soils.
Portugal	3325	When the "Round Up Event" become allowed all the farmers in Portugal will be with no exceptions producers of transgenic maize.The influences and the politician decisions are causing serious problems to the Portuguese farmers speaking about the technological level of biodiversity. Higher production safety in GM maize.

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Country	Quest. Nr.	Additional remarks
Portugal	3326	The influences and the politician decisions are causing serious problems to the Portuguese farmers speaking about the technological level of biodiversity. Higher production safety in GM maize. Inconsistency and Injustice of the politican decisions are causing serious problems to the Portuguese farmers speaking about the technological level of other biodiversity GMO events. When other "events" become allowed in Portugal will be much more producers of transgenic (GM) maize.
Portugal	3327	The politician decisions and the influences are causing serious problems to the Portuguese farmers speaking about the technological level of biodiversity. The companies of biodiversity should be even greater credibility and greater confidence among the population.
Portugal	3328	GM plants and the GM fields are synonymous of "best production safety". An important and significant reduction in the use of quantities of pesticides in GM maize contributed to lower costs with plant protection products (insecticides, pesticides...)reducing the economical risks of production GM maize and also contributed to better environmental protection and protection of animal life in soils.
Portugal	3329	Greater economic profitability in the production of GM maize. Excellent yields produced with GM maize is one of the most significant specific features in transgenic maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3330	The maize varieties and cycles, the different cultivation techniques and the environmental factors (soils and climates) affect more than any real type of maize planted (transgenic or conventional). Ignorance of the majority of the population about the GM maize. Injustice of the politician decisions are causing serious problems to the Portuguese farmers speaking about the technological level of other biodiversity GMO events.
Portugal	3331	Areas where the maize borer and the other pests do not attack to much, do not worth economically producing transgenic maize.However the GM plants and the GM fields are synonymous of "best production safety".

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Country	Quest. Nr.	Additional remarks
Portugal	3332	The GM maize is more pure, presents less levels of toxins.The quality of GM maize is clearly higher compared with the conventional maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize. World food needs will be surpassed by technologies of biodiversity.
Portugal	3333	The quality of GM maize is clearly higher compared with the conventional maize. Greater economic profitability in the production of GM maize in same cases.
Portugal	3335	Higher production safety in GM maize. The safety production and the natural reducing of the production risks influence farmers to choose the GM maize.
Portugal	3336	The different cultivation techniques and the environmental factors (soils and climates) affect more than any real type of maize planted (GM or conventional).
Portugal	3337	The GM maize is more pure, presents less levels of toxins. The quality of GM forage maize is very good for the main alimentacion of the animals. Ignorance of the majority of the population about the GM maize. An important and significant reduction in the use of quantities of pesticides in GM maize contributed to better environmental protection and protection of animal life in soils.
Portugal	3338	The region had a small an lower incidence of pests attacks. In fact was very difficult for the farmer to record assessments between the GM maize and the conventional maize.
Portugal	3339	The region had a small an lower incidence of pests attacks. In fact was very difficult for the farmer to record assessments between the GM maize and the conventional maize. Regions where the maize borer and the other pests don´t attack to much, don't worth economically producing transgenic maize.
Portugal	3341	The region had a small an lower incidence of pests attacks. Regions of maize production where the maize borer and the other pests don´t attack to much, don't worth economically producing transgenic maize.
Portugal	3342	Higher production safety in GM maize.

Table A.19: Motivations for not complying with the label recommendations (section 4.2)

Country	Quest. Nr.	Compliance	Reasons
Spain	3367	no	To plant a refuge complicate me the sowing
Spain	3378	no	If I plant a refuge ECB attacks produces big yield losses
Spain	3407	no	I had to sow very quick and I did not have time to plant a refuge
Spain	3472	no	I did not plant a refuge
Spain	3476	no	I did not plant a refuge
Spain	3495	no	I did not read the label recommendations

Table A.20: Motivations for not planting a refuge (section 4.3)

Country	Quest. Nr.	Plant refuge?	Reasons
Spain	3367	no	It complicates the sowing
Spain	3378	no	ECB attacks produces big yield losses
Spain	3407	no	I had short time to sow and to plant a refuge complicate me the sowing
Spain	3472	no	It complicates the sowing
Spain	3476	no	It complicates the sowing
Spain	3495	no	I did not read the label recommendations

Appendix B

Questionnaire

2	0	1	1	-	0	1	-	M	A	R	-	E	S	-	0	1	-	0	1	-	0	1

Year - Event - Partner - Country -Interviewer- Farmer - Area

EuropaBio Monitoring WG Farmer Questionnaire

Product: insect protected YieldGard® maize

<u>Farmer personal and confidential data</u>

Name of farmer: ____________________________________

Address of farmer: ____________________________________

City: ____________________________________

Postal code: ____________________________________

Name of interviewer: ____________________________________

Date of interview (DD / MM / YYYY):_____/______/_________

The personal data of the farmer will be handled in accordance with applicable data protection legislation. The personal data of the farmers may be used for the purpose of interviews necessary for the survey if the farmers have authorised this use as per the data protection legislation.

The questionnaires will be encoded to protect farmers' identity in the survey and confidentiality agreements will be put in place between the different parties (i.e. authorisation holders, licensees, interviewers and analyst) to further enforce this. The identity of a farmer will only be revealed to the authorisation holders if an adverse effect linked to their trait has been identified and needs to be investigated.

Furthermore, the agreements between the different parties will also ensure that any information collected in the questionnaires will not be improperly shared or used.

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Code:

Year ☐☐☐☐ Event ☐☐ Partner ☐☐☐ Country ☐☐ Interviewer ☐☐

Farmer ☐☐ Area ☐☐

Coding explanations:

2	0	1	0	-	0	1	-	B	M	A	-	G	E	-	0	1	-	0	1	-	0	1

Year — Event Code — Partner[1] Code — Country Code — Interviewer[2] Code — Farmer Code — Area Code

Codes:

Event:
- 01 MON 810
- 02 NK 603
- 03 …

Partner[1]:
- MON Monsanto
- MAR Markin
- AGR Agro.Ges
- ... ...

Country:
- ES Spain
- PT Portugal
- PL Poland
- …

Interviewer[2]:
- 01 A
- 02 B
- 03 …

Farmer: incremental counter within the interviewer

Area: incremental counter within the farmer

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[1] Partner is the organization that implements the survey

[2] Interviewer is the employee from the Partner that is contacting the farmers

2	0	1	1	-	0	1	-	M	A	R	-	E	S	-	0	1	-	0	1	-	0	1

Year - Event - Partner - Country -Interviewer- Farmer - Area

1 Maize grown area

1.1 Location:

Country: ____

County: ____

1.2 Surrounding environment:

Which of the following would best describe the land usage in the surrounding of the areas planted with YieldGard® maize

O Farmland
O Forest or wild habitat
O Residential or industrial

1.3 Size and number of fields of the maize cultivated area:

Total area of all maize cultivated on farm (ha) ________________

Total area of YieldGard® maize cultivated on farm (ha) ________________

Number of fields cultivated with YieldGard® maize ______________

1.4 Maize varieties grown:

List up to five YieldGard® maize varieties planted this season:

1. _________________________
2. _________________________
3. _________________________
4. _________________________
5. _________________________

List up to five conventional varieties planted this season:

1. _________________________
2. _________________________
3. _________________________
4. _________________________
5. _________________________

Are you growing any other GM maize varieties this season?[3]

O Yes O No

[3] Note: This question does not need to be asked in the 2011 season.

1.5 Soil characteristics of the maize grown area:

Mark the predominant soil type of the maize grown area (soil texture):

O very fine (clay)
O fine (clay, sandy clay, silty clay)
O medium (sandy clay loam, clay loam, sandy silt)
O medium-fine (silty clay loam, silt loam)loam)
O coarse (sand, loamy sand, sandy loam)
O no predominant soil type (too variable across the maize grown area on the farm)
O I do not know

Characterize soil quality of the maize grown area (fertility):

O below average - poor
O average - normal
O above average -good

Organic carbon content (%) ____________________

1.6 Local pest and disease pressure in maize:

Characterize this season's general pest pressure on the maize cultivated area:

Diseases (fungal, viral)	O Low	O As usual	O High
Pests (insects, mites, nematodes)	O Low	O As usual	O High
Weeds	O Low	O As usual	O High

2 Typical agronomic practices to grow maize on your farm

2.1 Irrigation of maize grown area:

O Yes O No

If yes, which type of irrigation technique do you apply:

O Gravity O Sprinkler O Pivot O Other

2.2 Major rotation of the maize grown area:

previous year: ________________________

two years ago: ________________________

2.3 Soil tillage practices:

O No O Yes (mark the time of tillage: O Winter O Spring)

2.4 Maize planting technique:

O Conventional planting
O Mulch
O Direct sowing

2.5 Mark all typical weed and pest control practices in maize at your farm:

O Herbicide(s)

O Insecticide(s)
If box checked, do you treat against maize borers? O Yes O No

O Fungicide(s)
O Mechanical weed control
O Use of bio control treatments (e.g. Trichogramma)
O Other, please specify: ____________________

2.6 Application of fertilizer to maize grown area:

O Yes O No

2.7 Typical time of maize sowing *range* ***(DD:MM – DD:MM):***

________/_________ -- ________/__________

2.8 Typical time of maize harvest *range* ***(DD:MM – DD:MM):***

Grain maize: ________/_________ -- ________/__________
Forage maize: ________/_________ -- ________/__________

3 Observations of YieldGard® maize

3.1 Agricultural practices in YieldGard® maize (compared to conventional maize)

Did you change your agricultural practices in YieldGard® maize compared to conventional maize? If any of the answers is different from «As usual», please specify the change.

How did you perform your crop rotate for YieldGard® maize compared with conventional maize?

O As usual O Changed, because (*describe the rotation*): ______________

____

____

Did you plant YieldGard® maize earlier or later than conventional maize?

O As usual O Earlier O Later, because: ________________________

Did you change your soil tillage or maize planting techniques to plant YieldGard® maize?

O As usual O Changed, because: _______________________________

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2	0	1	1	-	0	1	-	M	A	R	-	E	S	-	0	1	-	0	1	-	0	1

Year - Event - Partner - Country -Interviewer- Farmer - Area

Full commercial name of insecticides you applied in YieldGard® maize field, including seed treatments:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

Full commercial name of herbicides you applied in YieldGard® maize field:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

Full commercial name of fungicides you applied in YieldGard® maize field:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

In 2011, how were the weed and pest control practices in YieldGard® maize when compared to conventional maize?

Insecticides: O Similar O Different, because:______________________

Herbicides: O Similar O Different, because:______________________

Fungicides: O Similar O Different, because:______________________

In 2011, did you change maize borer control practices in YieldGard® maize when compared to conventional maize?

O Similar O Changed, because:______________________

In 2011, how were the fertilizer application practices in YieldGard® maize when compared to conventional maize?

O Similar O Changed, because:______________________

In 2011, how were the irrigation practices in YieldGard® maize when compared to conventional maize?

O Similar O Changed, because:______________________________

Did you harvest YieldGard® maize earlier or later than conventional maize?

O Similar O Earlier O Later Because:______________________

3.2 *Characteristics of YieldGard® maize in the field (compared to conventional maize)*

Germination vigour	O As usual	O More vigorous	O Less vigorous
Time to emergence	O As usual	O Accelerated	O Delayed
Time to male flowering	O As usual	O Accelerated	O Delayed
Plant growth and development	O As usual	O Accelerated	O Delayed
Incidence of stalk/root lodging	O As usual	O More often	O Less often
Time to maturity	O As usual	O Accelerated	O Delayed
Yield	O As usual	O Higher yield	O Lower yield
Occurrence of volunteers from previous year planting (if relevant)	O As usual	O More often	O Less often

If any of the answers above is different from «As usual», please specify:
____
____
____
____

Please detail any additional unusual observations regarding the YieldGard® maize maize during its growth:______________________________________
____
____

3.3 Characterise the YieldGard® maize susceptibility to disease (compared to conventional maize)

Overall assessment of disease susceptibility of YieldGard® maize compared to conventional maize (fungal, viral diseases):

O As usual O More susceptible[4] O Less susceptible[4]

If the above answer is different from «As usual», please specify the difference in disease susceptibility in the list and the commentary section below:

1. *Fusarium* spp	O More	O Less
2. *Ustilago maydis = U. zeae*	O More	O Less
3. xxx	O More	O Less
4. xxx	O More	O Less
5. xxx	O More	O Less
6. Other: ______________________	O More	O Less

Additional comments: ____
____
____

3.4 Characterise the INSECT pest control in YieldGard® maize fields (compared to conventional maize)

On the two insects controlled by YieldGard® maize, overall efficacy of the GM varieties on:

1. European corn borer (Ostrinia nubilalis):

   O Very good O Good O Weak O Don't Know

2. Pink borer (Sesamia spp):

   O Very good O Good O Weak O Don't Know

Additional comments: ____
____
____

3.5 Characterise the YieldGard® maize susceptibility to OTHER pests susceptibility (compared to conventional maize)

Except the two insects mentioned above, overall assessment of pest susceptibility of YieldGard® maize compared to conventional maize (insect, mite, nematode pests):

O A usual O More susceptible O Less susceptible

[4] More susceptible than conventional maize or Less susceptible than conventional maize

If the above answer is different from «As usual», please specify the difference in pest susceptibility in the list and the commentary section below:

1. ______________________ O More O Less
2. ______________________ O More O Less
3. ______________________ O More O Less
4. ______________________ O More O Less
5. ______________________ O More O Less

Additional comments: ____________________________________

____

3.6 Characterise the weed pressure in YieldGard® maize fields (compared to conventional maize)

Overall assessment of the weed pressure in YieldGard® maize compared to conventional maize:

O As usual O More weeds O Less weeds

List the three most abundant weeds in your YieldGard® maize field:

1. ____________________________________
2. ____________________________________
3. ____________________________________

Were there any unusual observations regarding the occurrence of weeds in YieldGard® maize? ____________________________________

____

3.7 Occurrence of wildlife in YieldGard® maize fields (compared to conventional maize)

General impression of the occurrence of wildlife (insects, birds, and mammals) in YieldGard® maize compared to conventional maize fields:

Occurrence of insects (arthropods):

O As usual O More O Less O Do not know

If the answer above is «More» or «Less», please specify your observation:

____

Occurrence of birds:

O As usual O More O Less O Do not know

If the answer above is «More» or «Less», please specify your observation:

____

____

Occurrence of mammals:

O As usual O More O Less O Do not know

If the answer above is «More» or «Less», please specify your observation:

____

____

3.8 Feed use of YieldGard® maize (if previous year experience with this event)

Did you use the YieldGard® maize harvest for animal feed on your farm?

O Yes O No

If "Yes", please give your general impression of the performance of the animals fed YieldGard® maize compared to animals fed conventional maize.

O As usual O Different O Do not know

If the answer above is «Different», please specify your observation:

____

____

____

3.9 Any additional remarks or observations [e.g. from fields planted with event xxxx that were not selected for the survey]

____

____

____

____

____

4 Implementation of Bt-maize specific measures

4.1 Have you been informed on good agricultural practices for YieldGard® maize?

O Yes O No

Only if you answered "Yes", would you evaluate these technical sessions as:

O Very useful O Useful O Not useful

4.2 Seed

Was the seed bag labelled with accompanying specific documentation indicating that the product is genetically modified maize YieldGard® maize?

O Yes O No

Did you comply with the label recommendations on seed bags?

O Yes
O No, because:____
____
____
____

4.3 Prevention of insect resistance

Did you plant a refuge in accordance to the technical guidelines?

O Yes
O No, because the surface of YieldGard® maize planted on the farm is < 5 ha
O No, because ____
____
____
____