



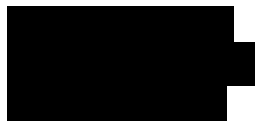
**Review of Scientific Literature Relevant to the
Food/Feed and Environmental Risk Assessment of
Event MIR604 Maize**

Literature Review

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-----------|--|
| EU | European Union |
| ISAAA | International Service for the Acquisition of Agri-Biotech Applications |
| PICO/PECO | Population, Intervention/Exposure, Comparator, Outcomes |

1.0 OBJECTIVE

The purpose of this systematic literature search is to identify literature and/or information on MIR604 maize that is relevant to the risk assessment of genetically modified organisms. Syngenta transformed maize (*Zea mays* L., corn) to produce Event MIR604 maize, which provides control of certain coleopteran insect pests. Event MIR604 maize plants contain the transgene *mcry3A*, which encodes the insecticidal protein mCry3A, and the transgene *pmi*, which encodes the enzyme phosphomannose isomerase (PMI). The native Cry3A from the soil bacterium *Bacillus thuringiensis* subsp. *tenebrionis* is active against certain coleopteran pests of maize. The mCry3A produced by MIR604 was modified to have enhanced activity against the Western corn rootworm (*Diabrotica virgifera virgifera*) and other related coleopteran pests. The transgene *pmi* (also known as *manA*) was derived from *Escherichia coli* strain K-12. PMI enables transformed plant cells to utilize mannose as a primary carbon source; it was used as a selectable marker in the development of MIR604 maize. The PMI protein expressed in MIR604 maize differs from the *E.coli* PMI by two amino acids and was designated MIR604 PMI.

This report defines the 1) review question; 2) the search strategy; and 3) the explicit methods for selecting and categorizing the records. The results of the selection process are reported including consideration of the implications of any findings. This report aims to comply with the EFSA explanatory note on literature searching for GMO applications (EFSA 2019).

2.0 FORMULATING REVIEW QUESTIONS AND CLARIFYING THEIR PURPOSE

2.1 Review Question

The review question associated with this literature search was:

Do either food/feed products derived from MIR604 maize or the intended trait have adverse effects on human and/or animal health and/or the environment?

This review question follows the PICO/PECO structure with key elements “Population, Intervention/Exposure, Comparator, Outcomes” (Table 1).

TABLE 1 Review question in PICO/PECO structure

| Element | Components of Review Question |
|--|--|
| <u>P</u> opulation | Human and animal health and the environment |
| <u>I</u> ntervention/ <u>E</u> xposure | MIR604 maize derived food/feed products, mCry3A and PMI and closely related variants |
| <u>C</u> omparator | conventional counterpart (if applicable) |
| <u>O</u> utcome | adverse effects |

2.2 Eligibility/Inclusion Criteria

Tables 2 and 3 summarize the eligibility/inclusion criteria for establishing relevance of retrieved records. Table 2 provides high level key concepts for inclusion/exclusion and Table 3 provides more explicit information on the information/data requirements concept. The eligibility/inclusion criteria are provided in the order of importance or ease of finding information on the criteria within a publication. The first failed eligibility/inclusion criterion was used as the primary reason for exclusion, and the remaining criteria were not assessed. Internet pages were screened first by date range June 1, 2018 to June 30, 2019. Pages without dates were evaluated further using the criteria in Tables 2 and 3.

TABLE 2 Eligibility/Inclusion Criteria to Establish Relevance

| Concepts | Criteria | Comment |
|---------------------------------------|--|---|
| Intervention/exposure | MIR604 maize, derived food/feed products, and/or the intended trait(s) | Intended traits include mCry3A and PMI and closely related variants. Any protein classified by the author as a Cry3A protein will be considered a closely related variant of the mCry3A protein. Any enzyme classified by the author as a phosphomannose isomerase was considered a closely related variant of PMI. |
| Information/data requirements | Data inform one or more information/data requirement(s) for the GMO and derived food/feed products under consideration, including the intended trait(s) | Publications that potentially contribute to the knowledge informing the risk assessment of MIR604 maize (information/data requirements provided in Table 3) were considered relevant. Based on the scope of the application certain information/data requirements are excluded. These are also detailed in Table 3. Publications addressing issues such as benefits, socio-economics, ethics, crop protection, detection methods, efficacy, public perception and risk communication were excluded using this criterion, as they are not relevant to the risk assessment as defined in this document. |
| Scope of GMO application | The pathways and level of exposure to the GMO, derived food/feed products, and the intended trait(s) addressed in the publication are relevant for the intended uses of the GMO and derived food/feed products under regulatory review | The scope of the application associated with this literature review is import and processing for food/feed uses. Therefore, publications must address pathways and levels of exposure relevant to the scope of the application to be included. |
| Reporting format | Original/primary data are presented in the publication or it is a risk assessment from a relevant key organization (such as regulatory agencies and risk assessment bodies involved in the risk assessment of GMOs) | Records that do not present original/primary data (e.g. reviews, editorials, position papers) were excluded. Reviews were only included if they present data that are not available from a primary research study. Risk assessments performed and reported by relevant key organizations were included if they address MIR604 maize, mCry3A, or PMI and closely related variants. |
| Previously risk assessed publications | As indicated by EFSA, a publication should be included if it has not been previously risk assessed by EFSA and/or its GMO Panel and is not cited/referenced in an EFSA/GMO Panel output | If a publication has previously been considered by EFSA it was excluded. Any cited/referenced publications contained within documents produced by EFSA and/or its GMO Panel was also excluded. |
| Access | Full-text document is accessible | If potentially relevant full-text documents could not be obtained, then they were listed in a table with a description of the (unsuccessful) methods that have been used to try to obtain a copy. |

| Concepts | Criteria | Comment |
|-----------------------|--|--|
| Population | Human and animal health, and/or the environment are addressed as general protection goals | All of the information/data requirements categories described in Table 3 are thought to inform the risk assessment related to human and animal health, and/or the environment. Therefore, if a publication meets the inclusion criteria described in this Table and is relevant to the information/data requirements in Table 3 it was considered relevant. |
| Outcomes | Effects/impacts on human and animal health, and/or the environment are addressed | All of the information/data requirements categories described in Table 3 are thought to inform the risk assessment related to human and animal health, and/or the environment. Therefore, if a publication meets the inclusion criteria described in this Table and is relevant to the information/data requirements in Table 3 it was considered relevant. |
| Comparator | If the publication is a comparative study that uses plant material as a test material, eligible publications must report a non-GM variety | Publications that address MIR604 maize must also include a conventional counterpart as a comparator in those cases where comparative analysis is conducted and plant material is used as test material. Any uncertainties about the appropriateness of the comparator was addressed in the assessment of the publication. |
| Plant species | The publication addresses the same plant species as the GMO under consideration | This literature review aims at determining the safe use of the intended traits(s) of MIR604 maize. Therefore, GMOs that contain the same transgenic proteins, but are introduced into another plant species may be included. For certain types of data, the presence of mCry3A and PMI in a different plant species will not impact the assessment of MIR604 maize. Those types of data are identified in Table 3. |
| Target pest/organisms | Target pests/organisms addressed in the study are established in the EU | Records related to the intervention/exposure and target pests/organisms were excluded because the scope of the application is import for food/feed uses and this would be relevant for cultivation applications only |
| Reporting format | A study should only be presented once, but if it is presented in more than one publication, all publications should be listed and grouped. | Duplicate publications were excluded at the initial screening stage. Only one copy of a study was presented even if it is reported in different publications. |
| Date of information | For internet pages only, the date of the information presented should be within the date range of the literature review (from June 1, 2018 through the date the search was conducted). | Documents returned from the searches of the webpages that were out of date were excluded. |

TABLE 3 Overview of Main Categories of Information/Data Requirements

Expert knowledge on data used in the risk assessment of the GMO is required but the list below provides some examples of relevant data/information.

| Information/data requirement | Non-exhaustive list of specific information/data requirements |
|--|---|
| Molecular characterization of the genetic modification of MIR604 maize | <ul style="list-style-type: none"> • Information on the insert including: sequence, size, copy number, genetic element arrangement, deletions, location, sequence similarity searches, analysis of open reading frames • Expression data of inserted/modified sequences • Genetic stability • Molecular and biochemical characterization of the protein(s) such as: primary structure, molecular weight, post-translational modifications • Assessment of enzymatic activity including substrate specificity and reaction products with respect to safety and/or nutritional balance • Data on the equivalence between plant-produced and microbially-produced proteins |
| Agronomic, phenotypic and compositional characterization of the MIR604 maize | <ul style="list-style-type: none"> • Comparative assessment of agronomic and phenotypic characteristics under field or controlled conditions • Comparative analysis of key nutritional constituents were only considered relevant if generated on MIR604 maize material. |
| Toxicological assessment of newly expressed protein(s), new constituents other than proteins, and the whole GM food/feed | <ul style="list-style-type: none"> • Amino acid sequence comparison between the newly expressed protein(s) and toxic proteins • Stability of the protein(s) under relevant processing and storage conditions • Investigation of proteolytic susceptibility of the newly expressed protein • Toxicity studies • Feeding studies that used plant material must use MIR604 maize as the source of plant material to be considered relevant |
| Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity | <ul style="list-style-type: none"> • Amino acid sequence comparison between the newly expressed protein and known allergens or celiac disease peptide sequences • Serum screening • Pepsin susceptibility testing • <i>In vivo</i> tests in animal models • Expression data for endogenous allergens in maize • Comparison of newly expressed proteins to known strong adjuvants |
| Nutritional assessment of the newly expressed protein(s), other new constituents, as well as potential alterations in the total diet of the consumer or the animal | <ul style="list-style-type: none"> • Anticipated dietary intake of food/feed from MIR604 maize and the resulting nutritional impact • Comparative growth performance studies with young rapidly growing animal species. If the diet contains plant material the source of the plant material must be MIR604 to be considered relevant. |

| Information/data requirement | Non-exhaustive list of specific information/data requirements |
|---|--|
| Post-market monitoring | <ul style="list-style-type: none"> Description of mechanisms for determining actual changes to overall dietary intake patterns of the GM food, to what extent this has occurred and whether or not the product induces known (side) effects or unexpected side effects Information on the reliability, sensitivity and specificity of the post market monitoring |
| Persistence and invasiveness assessment, including plant-to-plant gene transfer | <ul style="list-style-type: none"> Measurements of volunteer occurrence and establishment Replacement capacity Fitness of the GM plant in various environmental conditions – if mCry3A, PMI or closely related variants are expressed in a different plant species then the publication may be considered relevant. |
| Assessment of plant to micro-organism gene transfer | <ul style="list-style-type: none"> Homology searches at nucleotide level between the GM event and microorganisms. Publications would have to utilize sequence from MIR604 maize specifically to be considered relevant |
| Assessment of interactions with target organisms | <ul style="list-style-type: none"> Excluded based on the scope of the application. The scope of this application covers the import, processing and food and feed use of MIR604 maize in the EU. According to the EFSA ERA Guidance (EFSA, 2010): “<i>resistance development is only relevant for applications with scope cultivation of GM plants and not for applications restricted to import and processing of GM plants and their products</i>” (EFSA, 2010). Therefore, an assessment of the potential resistance development in target organisms resulting from the import, processing and food and feed use MIR604 maize is not relevant for this application. |
| Assessment of interactions with nontarget organisms | <ul style="list-style-type: none"> The EFSA ERA Guidance (EFSA, 2010) states that: “in cases where the application does not include cultivation in the EU, direct environmental exposure of NTOs to the GM plant is via accidental release into the environment of seeds or propagules during transportation and processing. This may result in sporadic occurrence of feral plants and therefore exposure of NTO populations is likely to be negligible. The ERA will then focus on indirect exposure to products of the GM plant (e.g. through manure and faeces from animals fed the GM plant, and other by-products of industrial processes)”. Therefore, any publications that discuss direct exposure in test protein and laboratory studies or field survey data can be considered not relevant based on scope of application. |
| Assessment of interactions with biogeochemical and abiotic processes | <ul style="list-style-type: none"> Excluded based on the scope of the application. The scope of this application covers the import, processing and food and feed use of MIR604 maize in the EU. According to the EFSA ERA Guidance (EFSA, 2010): “<i>applications concerning food/feed uses and import and processing do not require scientific information on possible environmental effects associated with the cultivation of the plant</i>” therefore, an assessment of the impacts of MIR604 maize on biogeochemical processes resulting from specific cultivation, management and harvesting techniques is not relevant given the scope of this application. |

| Information/data requirement | Non-exhaustive list of specific information/data requirements |
|--|--|
| Assessment of impact of specific cultivation, management and harvesting techniques | <ul style="list-style-type: none"> Excluded based on the scope of the application. The scope of this application covers the import, processing and food and feed use of MIR604 maize in the EU. Cultivation of MIR604 maize in the EU is not included in the scope. According to the EFSA ERA guidance (EFSA 2010): “<i>for GM plants for import and processing that are not intended for cultivation in the EU, there is no need for an ERA for altered cultivation, management and harvesting techniques</i>”. Therefore, an assessment of impact of specific cultivation, management and harvesting techniques of MIR604 maize is not relevant for this application. |
| Risk mitigation | <ul style="list-style-type: none"> Excluded based on the scope of the application. Risk mitigation measures such as high dose/refuge strategy, isolation distance from protected habitats hosting species of conservation concern that are at risk, integrated pest/weed management are only relevant to cultivation. The scope of this application covers the import, processing and food and feed use of MIR604 maize. |
| Post-market environmental monitoring | <ul style="list-style-type: none"> Excluded based on the scope of the application. Monitoring such as insect resistance is relevant only to cultivation. The scope of this application covers the import, processing and food and feed use of MIR604 maize. |

3.0 SEARCHING FOR/IDENTIFYING RELEVANT PUBLICATIONS

3.1 Electronic Bibliographic Databases

To search for different types of publications and unpublished work that could provide information on the review question, multidisciplinary citation databases which include grey literature (i.e. not peer reviewed) were used. Medline, Agricola, CAB Abstracts, and BIOSIS Previews (provided by Ovid Technologies) were searched. Each of the databases has a thesaurus. Searching these databases fulfills the requirement to search a minimum of at least two multi-disciplinary/large databases.

These databases were selected based on their coverage of scientific literature for relevant subjects including, but not limited to, biomedicine, plant diseases, agriculture, life sciences, pesticides, human health and nutrition, animal health, plant science, biotechnology and environmental studies. Detailed information (e.g., list of subjects covered, coverage dates, update schedule, and sources for data) regarding each of the databases searched can be obtained upon request. The document types in these databases include: journal articles, technical letters and notes, conference proceedings, book chapters, reports, and articles in press.

3.2 Internet Searches

3.2.1 Key organizations

The internet pages of regulatory agencies and risk assessment bodies listed below (Table 4) were searched for documents related to MIR604 maize.

TABLE 4 Key Organizations Pages Included in the Search

| Regulatory agency name | URL |
|---|---|
| US Environmental Protection Agency | https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated |
| US Department of Agriculture | https://www.aphis.usda.gov/aphis/ourfocus/biotechnology |
| US Food and Drug Administration | https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon |
| Canadian Food Inspection Agency | http://www.inspection.gc.ca/plants/plants-with-novel-traits/notices-of-submission/eng/1300143491851/1300143550790 |
| Health Canada* | https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html |
| Food Standards Australia New Zealand | http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx |
| Office of the Gene Technology Regulator | http://www.ogtr.gov.au/ |
| Intersecretarial Commission on Biosafety of GMOs | http://www.conacyt.gob.mx/cibiogem/index.php/cibiogem |
| National Technical Commission on Biosafety | http://ctnbio.mcti.gov.br/ |
| National Advisory Commission on Agriculture Biotechnology** | https://www.argentina.gob.ar/agroindustria/alimentos-y-bioeconomia/ogm-comerciales |
| Ministry of Environment, Forest and Climate change | http://moef.gov.in/ |
| Ministry of Agriculture, Forestry and Fisheries | http://www.maff.go.jp/e/ |
| European Food Safety Authority | http://www.efsa.europa.eu/ |

*Also searches Environment and Climate Change Canada

**The traditional website search method was ineffective. Therefore, this webpage was searched using the find function <control F>.

3.2.2 Web-based search engines and databases

General search engines such as GOOGLE Scholar and web-based databases known to contain information specifically on effects of GMOs were not searched. The search of the databases and key organization websites is considered to provide an adequately comprehensive search of literature.

3.2.3 Manual searches

3.2.3.1 Checking reference lists

If any reviews, methodological publications, guidelines and scientific opinions from regulatory agencies were retrieved using the search strategy and classified as relevant to the review question, then the reference lists from those records were manually searched for new records (June 2018 through the date the search was conducted) that meet the eligibility/inclusion criteria.

3.2.3.2 Hand searching

Hand searching was not conducted. The search of the databases and key organization websites is considered to provide an adequately comprehensive search of literature.

3.2.3.3 Citation searching

Citation searching was not conducted. The search of the databases and key organization websites is considered to provide an adequately comprehensive search of literature.

3.3 Constructing the Search Strategy

3.3.1 Database searching

3.3.1.1 Approaches to develop searches

The “lumping” approach was utilized. A single search strategy was developed to capture all categories of information of interest in one search. This strategy was used because previous experience indicates that a manageable number of studies was returned.

3.3.1.2 Search terms

Identifying search terms

Search terms were identified by:

- Assessing subject indexing terms of relevant publications recorded in those electronic bibliographic databases that use thesauri
 - All publications returned from literature search reports that aim to comply with the EFSA explanatory note dated 2017 (EFSA 2017) and deemed relevant to the review questions were examined to determine the subject indexing terms associated with it.

- Seeking suggestions from experts and stakeholders
 - The search terms were developed using a multi-disciplinary team (i.e. risk assessors, information specialists, regulatory affairs managers).

Free-text terms and subject indexing terms

The searches with the Ovid platform utilized the keyword search in the advanced search window. The keyword search uses a default set of fields designated .mp, which vary by database. Therefore, Ovid uses the term “keyword” to indicate that it is executing a multi-field search. In each database the specific fields searched are a different combination of free-text and controlled vocabulary fields, with Ovid switching automatically to the appropriate fields when a database is selected.¹

In Ovid, the fields used in the .mp keyword search are word searchable, therefore any search only has to find a single word in a controlled vocabulary field that contains phrases to return as search results all references indexed to that subject heading. Thus, a search strategy which includes “genetic*” will return the following (highlighted below):

- **Genetically modified foods** or **genetic engineering** in the Subject Headings field in Agricola,
- Zea mays: species, maize, common, **genetically modified**, strain-Bt10 [Gramineae] in the Organism field in BIOSIS Previews,
- **Genetically engineered organisms** in the Subject Headings field in CAB Abstracts,
- Plants, **Genetically Modified** / ge [**Genetics**] or **Genetic Engineering** in MeSH Subject Headings in Medline

Subsequent combining of terms, (genetic* AND (modif* OR engineer*)) (in bold), yields all references with these headings to be in the final results for that search set. Therefore, it is not necessary to search each exact controlled phrase in order to return all references for each of the specific headings.

¹ In Agricola the .mp fields are: free-text—abstract; geographic area; identifier; meeting information; map information; note; original title; personal name as subject; title—and controlled vocabulary—category code; subject heading.

In BIOSIS Previews the .mp fields are: free-text—abstract; book title; gene name; miscellaneous descriptors; methods & equipment; original language book title; title—and controlled vocabulary—biosystematic codes; chemicals & biochemicals; concept codes; diseases; geopolitical locations; major concepts; organisms; parts, structure & systems of organisms; sequence data; super taxa; taxa notes; time.

In CAB Abstracts the .mp fields are: free-text—abstract; identifiers; original title; title—and controlled vocabulary—broad terms; geographic location; organism descriptors; subject headings.

In Medline the .mp fields are: free-text—abstract; keyword heading word; original title; synonyms; title; unique identifier—and controlled vocabulary—floating sub-heading word; name of substance word; organism supplementary concept word; protocol supplementary concept word; rare disease supplementary concept word; subject heading word.

Appendix A provides 1) the search history (including the full strategy used and fields searched as run in the database) and number of publications identified (line by line) for each bibliographic database prior to de-duplication and 2) the subject indexing used by each database as shown within the brackets after each search term.

3.3.1.3 Free-text searching functions

The search terms were selected to incorporate a wide variety of synonymous and related terms. Truncation and wildcards were used where appropriate to capture different conventions in spelling and variation in the endings of terms.

3.3.1.4 Search strings

Search strings were combined with Boolean and proximity operators appropriate for the scope of the review.

3.3.1.5 Key elements of review questions to use for best result

A very large number of publications were returned using only the four key elements of Event, Intended trait, Newly expressed protein, and Trade Name. To prevent a very large number of publications from being returned while still achieving sensitivity, additional key elements were added to the search strategy. Sensitivity was defined as the ability to return the previously deemed relevant articles with the new search string. ‘A very large number’ is not defined in the Explanatory Note (EFSA 2019); however, the number returned with other search strategies (e.g. (Event OR Intended Trait OR Newly Expressed Protein OR Trade Name) or (Event OR Trade name OR ((Intended Trait OR Newly Expressed Protein) AND (Plant Species or GMO)))) was so large that it could not be de-duplicated by the search platform.

Therefore, the search structure included the following search concepts/key elements; Event, Trade Name, Newly Expressed Proteins, or Intended Trait in the same publications as terms describing plant species and/or GMO general terms. The search strategy employed was:

- Event OR Trade name OR (Newly Expressed Protein(s) AND (GMO general OR Plant Species)) OR (Intended Trait – Insecticidal AND (GMO general AND Plant Species)) OR GMO general × Intended Traits

The search strategy employed captured literature relevant to MIR604 maize and is provided in Table 5. The same search string was used in all databases. Since the Ovid search platform simultaneously searches free-text and subject headings there is no disadvantage to using all search terms in all databases. For example, if ‘Genetically engineered organisms’ is a subject heading in CAB Abstracts but not in Agricola including this term in the search of the Agricola databases still allows for free-text searching of this term.

TABLE 5 Search String Strategy

| Set | Field | Search String | Concepts/Key Elements |
|-----|-------|--|---|
| 1 | Topic | MIR604 OR MIR 604 OR SYN-IR674-5 | Event MIR604 |
| 2 | Topic | Agrisure* ADJ2 RW* | Trade name for Event MIR604 |
| 3 | Topic | mCry3A* OR mCry 3A* OR mCry 3 A* OR Cry3A* OR Cry 3A* OR Cry 3 A* | Newly expressed protein in MIR604 |
| 4 | Topic | Phosphomannoisomerase OR Mannose 6-phosphate isomerase OR Phosphomannoseisomerase OR Phosphomannose isomerase OR 9023-88-5 OR AAA24109 OR EC 5.3.1.8 OR E.C. 5.3.1.8 | Newly expressed protein in MIR604 (selectable marker) |
| 5 | | #3 OR #4 | |
| 6 | Topic | ((Insect OR Insects OR coleoptera* OR pest OR pests OR rootworm* OR root worm* OR Diabrotica OR D virgifera OR D barberi OR MCR OR MCRW OR NCRW OR WCRW OR WCR) ADJ2 (toleran* OR resistan* OR protect* OR control*)) OR Bacillus thuringiensis OR B thuringiensis | Intended traits (insecticidal) |
| 7 | Topic | GMO* OR LMO* OR GM OR GE OR transgen* OR ((genetic* OR living OR biotech*) ADJ3 (modif* OR transform* OR manipul* OR improv* OR engineer* OR deriv*)) | GMO general |
| 8 | Topic | Maize* OR corn* OR Zea mays OR Z mays | Plant species |
| 9 | Topic | ((Bt OR Bacillus thuringiensis OR B thuringiensis) ADJ5 (maize* OR corn* OR mays)) OR Btmaize* OR Btcorn* | GMO general x intended traits |
| 10 | | #5 AND (#7 OR #8) | Newly expressed proteins AND (GMO general OR plant species) |
| 11 | | #6 AND (#7 AND #8) | Intended trait- insecticidal AND (GMO general AND Plant species) |
| 12 | | #1 OR #2 OR #10 OR #11 OR #9 | Event OR Trade name OR (Newly expressed proteins AND (GMO general OR plant species)) OR (Intended trait -insecticidal AND (GMO general AND Plant species)) OR GMO general x intended traits |

3.3.1.6 Use of multiple languages

The search terms used were in the English language or utilized the Roman alphabet. For the event name and trade name it is unlikely that there are translations because they are not words in the English language.

3.3.1.7 Time period

Due to the use of multiple (i.e. 4) multi-disciplinary databases and redundancy in coverage it is unlikely that late addition of a publication would be missed. Therefore, the returned literature was limited to that which was published between June 1, 2018 and June 30, 2019 (see Table 8).

3.3.1.8 Internet searching of regulatory agency webpages

The search terms selected are the event and protein names from the International Service for the Acquisition of Agri-Biotech Applications (ISAAA) (Table 6). The descriptions and information for the top 50 hits or 10% of the total hits (whichever is greater) for each search term/web page were collected.

TABLE 6 Nomenclature for the single event and newly expressed proteins from the ISAAA database for use in searching regulatory agency web pages

| Event | Search term | Concepts/Key Elements |
|--------|--------------------------|-------------------------|
| MIR604 | MIR604 | Event name |
| MIR604 | mCry3A | Newly expressed protein |
| MIR604 | Phosphomannose isomerase | Newly expressed protein |

3.4 Reference Publications

Previously conducted literature reviews have successfully returned literature relevant to the risk assessment of MIR604 maize. The search strategy defined in this report was run and the reference publications listed below in Table 7 were returned. Therefore, the search terms selected are suitable to retrieve and/or identify the already known literature on the intervention/exposure of MIR604 maize.

The reference publications utilized are identified in Table 7 (X indicates that the publication was retrieved in the database). The percentage of publications retrieved in each database is provided.

TABLE 7 Reference publications

| Data/Information requirement | Reference | Medline | CAB Abstracts | BIOSIS | Agricola |
|---|--|----------------|----------------------|---------------|-----------------|
| Assessment of interactions with nontarget organisms | Pellegrino E, Bedini S, Nuti M, Ercoli L, 2018. Impact of genetically engineered maize on agronomic, environmental and toxicological traits: a meta-analysis of 21 years of field data. Scientific Reports | X | | X | |
| Agronomic, phenotypic and compositional characterization of the GM plant Molecular characterization of the genetic modification of the GMO | Kramer C, Brune P, McDonald J, Nesbitt M, Sauve A, Storck-Weyhermueller S (2016). Evolution of risk assessment strategies for food and feed uses of stacked GM events. Plant Biotechnology Journal | X | | | |
| Agronomic, phenotypic and compositional characterization of the GM plant | Zhang M, Zhuo X, Wang J, Yang C, Powell CA, Chen R (2015). Phosphomannose isomerase affects the key enzymes of glycolysis and sucrose metabolism in transgenic sugarcane overexpressing the manA gene. Molecular Breeding | X | X | X | |
| Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity Toxicological assessment of newly expressed protein(s), new constituents other than proteins, and the whole GM food/feed | Tyshko NV, Britsina MV, Gmoshinsky IV, Zhanataev NS, Zorin SN, Mazo VK, Ozeretskovskaia MN, Semenov BF (2009). [Medical and biological safety assessment of genetically modified maize event MIR604: Report 2. Genotoxicologic, immunologic and allergologic examinations]. Vopr Pitan | | X | X | |
| Toxicological assessment of newly expressed protein(s), new constituents other than proteins, and the whole GM food/feed | Tutel'ian VA, Gapparov M, Avren'eva LI, Aksiuk IN, Guseva GV, Kravchenko LV, L'Vova LS, Saprykin VP, Tyshko NV, Chernysheva ON (2009). [Medical and biological safety assessment of genetically modified maize strain MIR604: Report 1. Toxicologo-hygienic examinations]. Vopr Pitan | | X | X | |
| Molecular characterization of the genetic modification of the GMO | Chen E and Defontes C (2014). Transgenic plants expressing modified CRY3A. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Chen E and Stacy C (2007a). Modified Cry3A toxins and nucleic acid sequences coding therefor. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Chen E and Stacy C (2007b). Modified Cry3A toxins. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |

| Data/Information requirement | Reference | Medline | CAB Abstracts | BIOSIS | Agricola |
|---|---|------------------|------------------|-------------------|------------------|
| Molecular characterization of the genetic modification of the GMO | Chen E and Stacy C (2009). Modified Cry3A toxins and nucleic acid sequences coding therefor. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Chen E and Stacy C (2011). Modified Cry3A toxins and nucleic acid sequences coding therefor. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Chen E and Stacy C (2012). Modified Cry3A toxins and nucleic acid sequences coding therefor. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Raybould A, Graser G, Hill K, Ward K (2012). Ecological risk assessments for transgenic crops with combined insect-resistance traits: the example of Bt11 × MIR604 maize. Journal of Applied Entomology | | X | X | X |
| Molecular characterization of the genetic modification of the GMO | Steiner H-Y, Chen E, Meghji M (2008). Corn event MIR604. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Molecular characterization of the genetic modification of the GMO | Steiner H-Y, Chen E, Meghji M (2013). Corn event MIR604. Official Gazette of the United States Patent & Trademark Office Patents. | | | X | |
| Molecular characterization of the genetic modification of the GMO | Steiner H-Y, Chen JS, Meghji M (2011). Corn event MIR604. Official Gazette of the United States Patent & Trademark Office Patents. | | | X | |
| Molecular characterization of the genetic modification of the GMO | Steiner H-Y, Chen E, Meghji M (2014). Corn event MIR604. Official Gazette of the United States Patent & Trademark Office Patents | | | X | |
| Persistence and invasiveness assessment, including plant-to-plant gene transfer | Wang X, Zhang S, Hu D, Zhao X, Li Y, Liu T, Wang J, Hou X, Li Y (2014). BcPMI2, isolated from non-heading Chinese cabbage encoding phosphomannose isomerase, improves stress tolerance in transgenic tobacco. Molecular Biology Reports | X | X | X | X |
| Persistence and invasiveness assessment, including plant-to-plant gene transfer | Haegle JW, Peterson PA (2007). The flow of maize pollen in a designed field plot. Maydica | | X | X | |
| | Percentage of records returned | 22.22% (4/18) | 33.33% (6/18) | 94.44% (17/18) | 11.11% (2/18) |

4.0 SUMMARIZING AND REPORTING THE DATA, AND CONSIDERING THE IMPLICATIONS OF THE FINDINGS

4.1 Selecting Publications

4.1.1 Database records

The process for selecting relevant publications was conducted in two stages. The first stage required a rapid assessment of titles and abstracts. Those records that were clearly not relevant from reviewing the title only were excluded from further review. For those records that appeared relevant or had unclear relevance the abstracts were reviewed. Those records that were clearly not relevant from reviewing the abstract were excluded from further review, while records that are relevant or have unclear relevance were reviewed in Stage 2.

Two independent reviewers examined the records for inclusion/exclusion for each eligible information/data requirement at all stages of review. Reviews and selections were conducted independently. During the rapid assessment process (Stage 1), only records that were deemed clearly not relevant by both reviewers were excluded from further review.

The reviewers met to discuss their disagreements and further refined their understanding of the criteria for relevance. The reviewers independently re-reviewed the potential relevance of those titles upon which they disagreed. Documents with vague and generic titles were moved forward for full-length document review.

A kappa test was performed after the title/abstract publication selection (stage 1) and before initiating the full-text screening process. The kappa test score was 0.746. The reviewers adopted a broad inclusion criteria to ensure that all potentially relevant publications were captured. At the completion of stage 1 there were 276 records retrieved from the databases (with duplicates removed). There were 274 agreements, including agreement regarding three manuscripts at the title/abstract phase which were subsequently moved to stage two. There were two disagreements due to conservative reviewer judgement rather than narrower reviewer judgement; these two publications proceeded to the next phase of review (review of the full documents).

Full-length articles were reviewed in Stage 2. A reason for exclusion is provided for any records that were deemed not relevant in Stage 2. Any relevant records identified in Stage 2 were subjected to reliability assessments and evaluations of the implications of those records on the food and feed or environmental risk assessments. Reviewers came to a consensus on all records.

4.1.2 Records from key organizations

The records returned from searching the websites of key organizations were considered relevant if they were risk assessments, scientific opinions/reports concerning the commercial release of GMO being examined or documents on the biology of the crop of interest. The regulatory agency webpages that were searched do not post primary data; therefore all other document types are not considered relevant.

The format of records returned from regulatory agency websites did not meet the format required to assess them using the two stage process followed for the database records. When the website records were published in English, they were assessed by two independent reviewers. Due to format the full-text documents were assessed to determine relevance. When the website records were not published in English a single reviewer that speaks the language of those documents determined if they should be classified as a risk assessment, scientific opinion/report or document on the biology of the crop of interest. If a document was classified as one of these document types then it was translated to English and two independent reviewers determined if it met the other criteria for inclusion. Only if records were classified as one of the relevant document types and excluded based on other eligibility criteria was the rationale for its exclusion provided. Internet pages with URLs that lead to meaningless or no information (broken links) were also excluded.

4.2 Summarizing and Reporting the Data

This report provides detail about the search process and its results. The methodological framework in this report involves summarising and reporting the literature, and applying meaning to the results as outlined in the Explanatory Note (EFSA 2019).

4.3 Results of the Publication Selection Process

For electronic bibliographic databases, the date on which the search was conducted, the date of the most recent update of the database, the service provider used, date span of the search, any limits applied to the search (e.g. study types, dates, languages) and the total number of records retrieved before and after removing duplicates were recorded. Additionally, the line by line strategy with the number of publications identified per line is presented. See Appendix A.

TABLE 8 Electronic bibliographic database search details

| Database | Search Date | Service provider | Date span of the search | Any limits applied to the search | Total number of records retrieved after removing duplicates |
|-----------------|-------------|-------------------|--------------------------|----------------------------------|---|
| Agricola | 05/07/2019 | Ovid Technologies | 01/06/2018 to 30/06/2019 | Dates | 5 |
| BIOSIS Previews | 05/07/2019 | Ovid Technologies | 01/06/2018 to 30/06/2019 | Dates | 93 |
| CAB Abstracts | 05/07/2019 | Ovid Technologies | 01/06/2018 to 30/06/2019 | Dates | 56 |
| Medline | 05/07/2019 | Ovid Technologies | 01/06/2018 to 30/06/2019 | Dates | 122 |

For records from websites the following were recorded (if available): the website name and service publisher used, justification for choosing the source, the URL, the date on which the search was conducted, the date of the most recent website update at the time it was searched, the date span of the search, the search terms used, any limits to the search, and the number of relevant records retrieved.

Table 6 contains the search terms used as a series of single searches for regulatory agency web pages.

For records from reference lists from manual searches, the following was recorded: the bibliographic details of the documents whose reference lists were scanned and the number of relevant bibliographic references retrieved.

TABLE 9 Regulatory agency webpage search details

| Regulatory agency name | URL | Date of Search | Date of Most Recent Website Update | Date Span of Search | Total number of records retrieved after removing duplicates | Number of relevant records |
|------------------------------------|---|----------------|------------------------------------|-------------------------------|---|----------------------------|
| US Environmental Protection Agency | https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated | 7/23/2019 | 10/24/2018 | June 1, 2018 to June 30, 2019 | 1 | 0 |
| US Department of Agriculture | https://www.aphis.usda.gov/aphis/ourfocus/biotechnology | 7/23/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 38 | 1 |
| US Food and Drug Administration | https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon | 7/23/2019 | 5/9/2019 | June 1, 2018 to June 30, 2019 | 10 | 0 |

| Regulatory agency name | URL | Date of Search | Date of Most Recent Website Update | Date Span of Search | Total number of records retrieved after removing duplicates | Number of relevant records |
|---|---|----------------|------------------------------------|-------------------------------|---|----------------------------|
| Canadian Food Inspection Agency | http://www.inspection.gc.ca/plants/plants-with-novel-traits/notices-of-submission/eng/1300143491851/1300143550790 | 7/24/2019 | 1/17/2019 | June 1, 2018 to June 30, 2019 | 11 | 1 |
| Health Canada | https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html | 7/24/2019 | 1/24/2019 | June 1, 2018 to June 30, 2019 | 21 | 1 |
| Food Standards Australia New Zealand | http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx | 7/25/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 37 | 2 |
| Office of the Gene Technology Regulator | http://www.ogtr.gov.au/ | 7/25/2019 | 7/25/2019 | June 1, 2018 to June 30, 2019 | 3 | 0 |
| Intersecretarial Commission on Biosafety of GMOs | http://www.conacyt.gob.mx/cibiogem/index.php/cibiogem | 7/19/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 4 | 0 |
| National Technical Commission on Biosafety | http://ctnbio.mcti.gov.br/ | 7/17/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 97 | 0 |
| National Advisory Commission on Agriculture Biotechnology | https://www.argentina.gob.ar/agroindustria/alimentos-y-bioeconomia/ogm-comerciales | 8/6/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 1 | 0 |
| Ministry of Environment, Forest and Climate change | http://moef.gov.in/ | 7/23/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 0 | 0 |
| Ministry of Agriculture, Forestry and Fisheries | http://www.maff.go.jp/e/ | 7/19/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 84 | 3 |
| European Food Safety Authority | http://www.efsa.europa.eu/ | 7/25/2019 | No update information provided | June 1, 2018 to June 30, 2019 | 13 | 0 |

The results of the selection process are recorded in Table 10 and a flow chart of the publication selection process is shown in Figure 1.

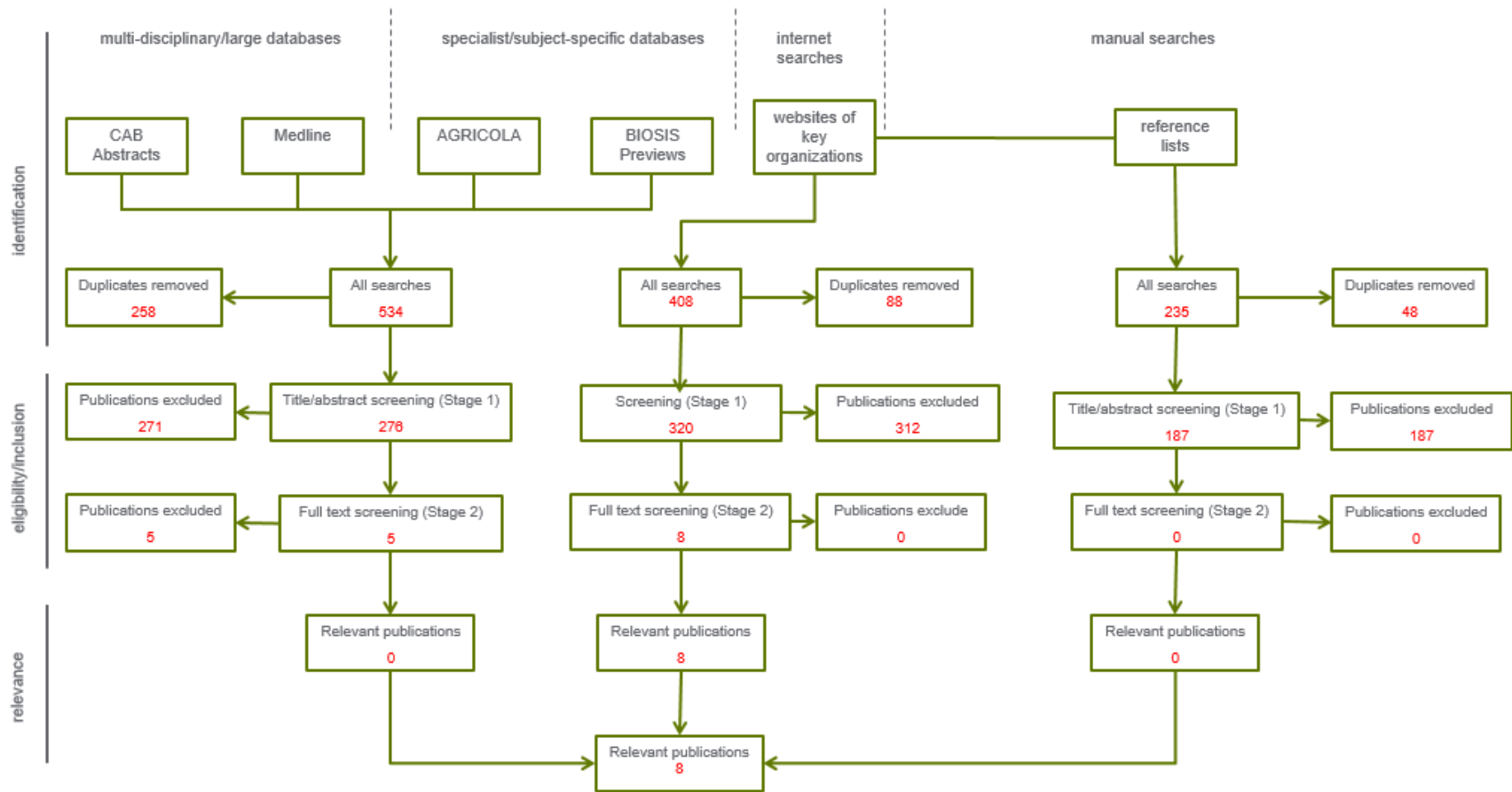
TABLE 10 Results of the publication selection process, for each review question and or group of information/data requirements searched

| Review question and/or category of information/data requirement(s) captured in the search | Number of publications |
|---|------------------------|
| Publications identified after all* searches of the scientific literature (excluding duplicates) | 783 |
| Database results identified | 276 |
| Internet results identified | 320 |
| **References from relevant database results identified | 187 |
| Publications excluded from the search results after screening of title and abstracts*** (stage 1) | 770 |
| Database results excluded | 271 |
| Internet results excluded | 312 |
| References from relevant database results excluded | 187 |
| Publications screened using full-text (stage 2) | 5 |
| Database results screened | 5 |
| Internet results screened | 0 |
| References from relevant database results screened (all already excluded) | 0 |
| Publications excluded after full-text screening | 5 |
| Database results full-text excluded | 5 |
| Internet results full-text excluded | 0 |
| References from relevant database results full-text excluded (all already excluded) | 0 |
| Unobtainable publications | 0 |
| Unclear publications | 0 |
| Publications considered relevant | 8 |
| Database results relevant | 0 |
| Internet results relevant | 8 |
| References from relevant database results relevant | 0 |

*Both from electronic bibliographic databases and other sources of scientific literature.

There were additional record titles (187) reviewed from the references of relevant internet documents retrieved from searching regulatory agency websites. These were excluded from search results after screening of titles. There were no relevant records found among these references. *Due to the formatting of records (e.g. lack of abstracts) from the websites of key organizations the stage 1 review was performed by a first scanning through the documents.

FIGURE 1 **Flow chart of the publication selection process**



4.4 Relevant Publications

A list of the full bibliographic references for all relevant publications, ordered by category of information/data requirement is recorded in Table 11. There were no relevant full-text documents retrieved from database searching.

TABLE 11 Report of all relevant publications retrieved after assessment of internet documents

| List of bibliographic references for all relevant publications, classified by category of information/data requirements* | | | |
|--|--|---|---|
| Category of information/data requirement(s) | Study (Author(s) and year) | Title | Source |
| Risk Assessment | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019a) | Confirmation of safety related to "heat-resistant α -amylase-producing maize line 3272" (draft) | http://www.maff.go.jp/j/council/sizai/siryoy/25_24/pdf/data5-3.pdf |
| Risk Assessment | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019b) | Results of the study by the crop subcommittee Document 4-1 | http://www.affrc.maff.go.jp/docs/comitee/diversity/120124/pdf/siryo_4_1.pdf |
| Risk Assessment | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019c) | Opinions of academics | http://www.maff.go.jp/j/press/syoutan/noutan/pdf/091111-06.pdf |
| Risk Assessment | Australia New Zealand Food Authority, no date provided (FSANZ 2019a) | Safety assessment report (at Approval) Application A1060 Food derived from Insect-protected Corn Line 5307 | http://www.foodstandards.gov.au/code/applications/Documents/A1060%20GM%20Corn%20Line%205307%20AppR%20SD1%20Safety%20Assess.s.doc |
| Risk Assessment | Australia New Zealand Food Authority, no date provided (FSANZ 2019b) | Application A1060 – Food Derived From Insect-Protected Corn Line 5307 Safety Assessment Report | http://www.foodstandards.gov.au/code/applications/Documents/A1060%20GM%20Corn%20Line%205307%20AR%20SD1%20Safety%20Assess.pdf |
| Risk Assessment | Health Canada (HC, 2018) | Decision Document DD2016-118 Determination of the Safety of Syngenta Canada Inc.'s Corn (Zea mays L.) Event MZIR098 | http://www.inspection.gc.ca/plants/plants-with-novel-traits/approved-under-review/decision-documents/dd2016-118/eng/1542814733003/1542814733217 |

List of bibliographic references for all relevant publications, classified by category of information/data requirements*

| Category of information/data requirement(s) | Study (Author(s) and year) | Title | Source |
|---|--|---|---|
| Risk Assessment | Canadian Food Inspection Agency (CFIA, 2018) | Decision Document DD2016-118 Determination of the Safety of Syngenta Canada Inc.'s Corn (Zea mays L.) Event MZIR098 | http://www.inspection.gc.ca/plants/plants-with-novel-traits/approved-under-review/decision-documents/dd2016-118/eng/1542814733003/1542814733217 |
| Risk Assessment | U.S. Department of Agriculture, no date provided (USDA 2019) | The Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), has prepared an Environmental Assessment (EA) in response to a petition (APHIS Number 04-362-01p) from Syngenta Seeds, Inc. | http://www.aphis.usda.gov/brs/aphis/docs/04_36201p_pea.pdf |

*FSANZ provided the same document but in two different formats (.doc and .pdf), which are the documents shown above. Therefore, one FSANZ document appears to be a duplicate. The Health Canada and the Canadian Food Inspection Agency webpages listed also were duplicates. The duplicate documents were kept because they were counted in the original search results. There are six unique documents.

4.5 Excluded Publications After Detailed Assessment of Full-Text Documents

A list of the full bibliographic references for all excluded studies retrieved from database searching after detailed assessment of full-text documents for relevance (i.e. stage 2), with justification for their exclusion, is recorded in Table 12.

TABLE 12 Report of publications excluded from the risk assessment after detailed assessment of full-text documents

| List of bibliographic references for all studies excluded from the risk assessment, classified by authors | | | |
|---|--|---|---|
| Study (Author(s) and year) | Title | Source | Reason(s) for exclusion based on eligibility/inclusion criteria |
| Agapito-Tenfen SZ et al. 2018 | Systematic miRNome profiling reveals differential microRNAs in transgenic maize metabolism | Environmental Sciences Europe | Intervention/exposure not relevant |
| Azhakanandam K et.al. 2018 | Protein expression and efficacy in transgenic maize events containing molecular stacks of two rootworm resistance traits | In Vitro Cellular & Development Biology Plant | Intervention/exposure not relevant |
| Bernillon S et al. 2018 | Characterization of GMO or glyphosate effects on the composition of maize grain and maize-based diet for rat feeding | Metabolomics | Intervention/exposure not relevant |
| Carzoli AK et al. 2018 | Risks and opportunities of GM crops: Bt maize example | Global Food Security | Reporting format – no primary data |
| Oliveira MR et al. 2018 | Nutritional composition and aerobic stability of wheat and corn silages stored under different environmental conditions | Semina: Ciencias Agrarias | Intervention/exposure not relevant |

4.6 Unobtainable Publications

No publications were considered unobtainable.

4.7 Unclear Publications

No publications were classified as unclear.

4.8 Full-Text Documents

Full text documents for all relevant publications were compiled using a reference management software (.RIS format) and accompany this final report.

4.9 Narrative Synthesis/Summary of Relevant Publications

A narrative synthesis/summary of the relevant studies describing their overall volume, strength and direction per main category of information/data requirements was not reported because this literature review was conducted for annual PMEM reports on GMOs authorized in the EU market and therefore it is not required.

4.10 Implications of Relevant Publications on Risk Assessment

The implications of the relevant publications on the risk assessment was assessed by considering whether the record presents new hazards, modified exposure pathways or new scientific uncertainties.

There were no relevant publications retrieved after detailed assessment of full-text documents for relevance.

The record reliability and its implication on the risk assessment was recorded in Table 13.

TABLE 13 Report of the reliability and implications for the risk assessment of all relevant publications retrieved after assessment of internet documents.

| List of bibliographic references for all relevant publications, classified by category of information/data requirements | | | |
|---|--|---|---|
| Category of information/data requirement(s) | Publication (Author(s) and year) | Summary of reliability appraisal | Implications for the risk assessment |
| Risk Assessment or scientific opinion | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019a) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk Assessment or scientific opinion | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019b) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk Assessment or scientific opinion | Ministry of Agriculture, Forestry and Fisheries, no date provided (MAFF 2019c) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk assessment or scientific opinion | Australia New Zealand Food Authority, no date provided (FSANZ 2019a) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |

List of bibliographic references for all relevant publications, classified by category of information/data requirements

| Category of information/data requirement(s) | Publication (Author(s) and year) | Summary of reliability appraisal | Implications for the risk assessment |
|---|--|---|---|
| Risk assessment or scientific opinion | Australia New Zealand Food Authority, no date provided (FSANZ 2019b) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk assessment or scientific opinion | Health Canada (HC, 2018) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk assessment or scientific opinion | Canadian Food Inspection Agency (CFIA, 2018) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |
| Risk assessment or scientific opinion | U.S. Department of Agriculture, no date provided (USDA 2019) | Not assignable because no or insufficient information is reported in the document | This document is considered a risk assessment based on a data package provided by the sponsor company, and contains their conclusions related to specific protection goals. The information provided in this document does not change the conclusion of the risk assessment for MIR604 maize. |

5.0 RECORDS TO BE MAINTAINED

Records maintained include, but are not be limited to, documentation of database search dates, database update dates, resolution of differences of opinion on records, the protocol, and any protocol amendments or deviations.

6.0 ARCHIVING OF STUDY RECORDS

The protocol amendments, deviations, raw data, related documentation, and final report are archived at Syngenta in Research Triangle Park, NC, USA.

7.0 REFERENCES

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- EFSA. 2019. Explanatory note on literature searching conducted in the context of GMO applications for (renewed) market authorization and annual post-market environmental monitoring reports on GMOs authorized in the EU market. EFSA supporting publications 2019:EN-1614.
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- FSANZ. 2019b. *Supporting document 1 Safety assessment report (at Approval) Application A1060 Food derived from Insect-protected Corn Line 5307*. Canberra, Australia: Food Standards Australia New Zealand.
<http://www.foodstandards.gov.au/code/applications/Documents/A1060%20GM%20Corn%20Line%205307%20AR%20SD1%20Safety%20Assess.pdf> (Accessed July 25, 2019)
- HC. 2018. Decision Document DD2016-118 Determination of the Safety of Syngenta Canada Inc.'s Corn (*Zea mays* L.) Event MZIR098. Ottawa, Canada Health Canada.
<http://www.inspection.gc.ca/plants/plants-with-novel-traits/approved-under-review/decision-documents/dd2016-118/eng/1542814733003/1542814733217> (accessed July 24, 2019)
- MAFF 2019a. *Confirmation of safety related to "heat-resistant α -amylase-producing maize line 3272" (draft)*. Tokyo, Japan Ministry of Agriculture, Forestry and Fisheries
http://www.maff.go.jp/j/council/sizai/siryou/25_24/pdf/data5-3.pdf (accessed July 19, 2019)
- MAFF 2019b. *Resistance to Lepidoptera and Coleoptera and herbicides glufosinate and glyphosate Resistant maize (modified cry1F, pat, cry34Ab1, cry35Ab1, cry1Ab, modified cp4 epsps, modified Strange Cry3Aa2, Zea Mays Subsp. Mays (L.) Iltis (1507 \times 59122 \times MON810 \times NK603 \times MIR604, OECD UI: DAS-Ø15Ø7-1 \times DAS-59122-7 \times MON-ØØ81Ø-6 \times MON-ØØ6Ø3-6 \times SYN-IR6Ø4-5)*. Tokyo, Japan Ministry of Agriculture, Forestry and Fisheries
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APPENDICES SECTION

APPENDIX A Search history and subject indexing

Ovid® Terms were searched individually line by line, however when the proximity operator adj2 is used the Ovid platform displays the terms on one line as a group such as (term,term2,term3)adj2 (term4,term5,term6)



Search My Workspace

▼ Search History (88)

| # ▲ | Searches | Results | Type | Actions | Annotations |
|-----------------------------|---|---------|----------|--|--------------------------|
| <input type="checkbox"/> 1 | MIR604.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 22 | Advanced | Display Results More | Contract |
| <input type="checkbox"/> 2 | MIR 604.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 2 | Advanced | Display Results More | |
| <input type="checkbox"/> 3 | SYN-IR674-5.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 4 | 1 or 2 or 3 | 24 | Advanced | Display Results More | |
| <input type="checkbox"/> 5 | (Agrisure* adj2 RW*).mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 6 | mCry3A*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 24 | Advanced | Display Results More | |
| <input type="checkbox"/> 7 | mCry 3A*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
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| <input type="checkbox"/> 9 | Cry3A*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 134 | Advanced | Display Results More | |
| <input type="checkbox"/> 10 | Cry 3A*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> 11 | Cry 3 A*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 12 | 6 or 7 or 8 or 9 or 10 or 11 | 154 | Advanced | Display Results More | |
| <input type="checkbox"/> 13 | Phosphomannoisomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 3 | Advanced | Display Results More | |
| <input type="checkbox"/> 14 | Mannose 6-phosphate isomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 37 | Advanced | Display Results More | |
| <input type="checkbox"/> 15 | Phosphomannose isomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 16 | Phosphomannose isomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 103 | Advanced | Display Results More | |
| <input type="checkbox"/> 17 | 9023-88-5.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 18 | AAA24109.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> 19 | "EC 5.3.1.8".mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 4 | Advanced | Display Results More | |
| <input type="checkbox"/> 20 | "E.C. 5.3.1.8".mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 4 | Advanced | Display Results More | |
| <input type="checkbox"/> 21 | 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 | 134 | Advanced | Display Results More | |
| <input type="checkbox"/> 22 | 12 or 21 | 288 | Advanced | Display Results More | |
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| <input type="checkbox"/> 24 | Insects.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 230884 | Advanced | Display Results More | |
| <input type="checkbox"/> 25 | coleoptera*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 37933 | Advanced | Display Results More | |
| <input type="checkbox"/> 26 | pest.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 64918 | Advanced | Display Results More | |
| <input type="checkbox"/> 27 | pests.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 333774 | Advanced | Display Results More | |
| <input type="checkbox"/> 28 | rootworm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1421 | Advanced | Display Results More | |
| <input type="checkbox"/> 29 | root worm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 41 | Advanced | Display Results More | |
| <input type="checkbox"/> 30 | Diabrotica.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1814 | Advanced | Display Results More | |

| | | | | | | |
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| <input type="checkbox"/> | 32 | D barberi.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 51 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 34 | MCRW.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 35 | NCRW.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 36 | WCRW.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 37 | WCR.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 191 | Advanced | Display Results More | |
| <input type="checkbox"/> | 38 | 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 | 450100 | Advanced | Display Results More | |
| <input type="checkbox"/> | 39 | toleran*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 97943 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 41 | protect*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 241546 | Advanced | Display Results More | |
| <input type="checkbox"/> | 42 | control*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 857102 | Advanced | Display Results More | |
| <input type="checkbox"/> | 43 | 39 or 40 or 41 or 42 | 1281835 | Advanced | Display Results More | |
| <input type="checkbox"/> | 44 | ((Insect or Insects or coleoptera* or pest or pests or rootworm* or root worm* or Diabrotica or D virgifera or D barberi or MCR or MCRW or NCRW or WCRW or WCR) adj2 (toleran* or resistan* or protect* or control*)).mp. | 115114 | Advanced | Display Results More | |
| <input type="checkbox"/> | 45 | Bacillus thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 9890 | Advanced | Display Results More | |
| <input type="checkbox"/> | 46 | B thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1552 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 51 | GE.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 4186 | Advanced | Display Results More | |
| <input type="checkbox"/> | 52 | transgen*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 47984 | Advanced | Display Results More | |
| <input type="checkbox"/> | 53 | genetic*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 593506 | Advanced | Display Results More | |
| <input type="checkbox"/> | 54 | living.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 47966 | Advanced | Display Results More | |
| <input type="checkbox"/> | 55 | biotech*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 34087 | Advanced | Display Results More | |
| <input type="checkbox"/> | 56 | 53 or 54 or 55 | 662300 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 58 | transform*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 141448 | Advanced | Display Results More | |
| <input type="checkbox"/> | 59 | manipulat*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 33427 | Advanced | Display Results More | |
| <input type="checkbox"/> | 60 | improv*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 424970 | Advanced | Display Results More | |
| <input type="checkbox"/> | 61 | engineer*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 128290 | Advanced | Display Results More | |
| <input type="checkbox"/> | 62 | deriv*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 246682 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 65 | 48 or 49 or 50 or 51 or 52 or 64 | 94562 | Advanced | Display Results More | |
| <input type="checkbox"/> | 66 | Maize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 61237 | Advanced | Display Results More | |
| <input type="checkbox"/> | 67 | corn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 117864 | Advanced | Display Results More | |
| <input type="checkbox"/> | 68 | Zea mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 44698 | Advanced | Display Results More | |
| <input type="checkbox"/> | 69 | Z mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 311 | Advanced | Display Results More | |
| <input type="checkbox"/> | 70 | 66 or 67 or 68 or 69 | 157396 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 72 | Bacillus thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 9890 | Advanced | Display Results More | |
| <input type="checkbox"/> | 73 | B thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1552 | Advanced | Display Results More | |
| <input type="checkbox"/> | 74 | 71 or 72 or 73 | 12623 | Advanced | Display Results More | |
| <input type="checkbox"/> | 75 | maize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 61237 | Advanced | Display Results More | |
| <input type="checkbox"/> | 76 | corn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 117864 | Advanced | Display Results More | |
| <input type="checkbox"/> | 77 | mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 44869 | Advanced | Display Results More | |
| <input type="checkbox"/> | 78 | 75 or 76 or 77 | 157523 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 80 | Btmaize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 81 | Btcorn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 82 | 79 or 80 or 81 | 1109 | Advanced | Display Results More | |
| <input type="checkbox"/> | 83 | 65 or 70 | 245900 | Advanced | Display Results More | |
| <input type="checkbox"/> | 84 | 22 and 83 | 163 | Advanced | Display Results More | |
| <input type="checkbox"/> | 85 | 65 and 70 | 6058 | Advanced | Display Results More | |
| <input type="checkbox"/> | 86 | 47 and 85 | 1377 | Advanced | Display Results More | |
| <input type="checkbox"/> | 87 | 4 or 5 or 82 or 84 or 86 | 1782 | Advanced | Display Results More | |
| <input type="checkbox"/> | 88 | limit 87 to yr="2018 -Current" | 57 | Advanced | Display Results More | |

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1 Resource selected | [Hide](#) | [Change](#)

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Enter keyword or phrase
(* or \$ for truncation)

☒ **Keyword** ☐ Author ☐ Title ☐ Journal

[Search](#)

▼ **Limits** [\(close\)](#)

☒ Map Term to Subject Heading

☐ English Language

☐ Abstracts

☐ Journal Articles

☐ Literature Reviews

☐ Latest Update

Publication Year -

[Additional Limits](#) [Edit Limits](#)

Ovid® Terms were searched individually line by line, however when the proximity operator adj2 is used the Ovid platform displays the terms on one line as a group such as (term,term2,term3)adj2 (term4,term5,term6)

Search My Workspace

▼ Search History (88)

| # ▲ | Searches | Results | Type | Actions | Annotations |
|--------------------------|--|---------|----------|--|--------------------------|
| <input type="checkbox"/> | 1 MIR604.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 50 | Advanced | Display Results More | Contract |
| <input type="checkbox"/> | 2 MIR 604.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 5 | Advanced | Display Results More | |
| <input type="checkbox"/> | 3 SYN-IR6?4-5.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 4 1 or 2 or 3 | 55 | Advanced | Display Results More | |
| <input type="checkbox"/> | 5 (Agrisure* adj2 RW*).mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 6 mCry3A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 52 | Advanced | Display Results More | |
| <input type="checkbox"/> | 7 mCry 3A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 8 mCry 3 A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 9 Cry3A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 267 | Advanced | Display Results More | |
| <input type="checkbox"/> | 10 Cry 3A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 10 | Advanced | Display Results More | |
| <input type="checkbox"/> | 11 Cry 3 A*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 2 | Advanced | Display Results More | |
| <input type="checkbox"/> | 12 6 or 7 or 8 or 9 or 10 or 11 | 316 | Advanced | Display Results More | |
| <input type="checkbox"/> | 13 Phosphomannoisomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 22 | Advanced | Display Results More | |
| <input type="checkbox"/> | 14 Mannose 6-phosphate isomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 128 | Advanced | Display Results More | |
| <input type="checkbox"/> | 15 Phosphomannose isomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 2 | Advanced | Display Results More | |
| <input type="checkbox"/> | 16 Phosphomannose isomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 391 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 18 AAA24109.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 19 "EC 5.3.1.8".mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 277 | Advanced | Display Results More | |
| <input type="checkbox"/> | 20 "E.C. 5.3.1.8".mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 277 | Advanced | Display Results More | |
| <input type="checkbox"/> | 21 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 | 737 | Advanced | Display Results More | |
| <input type="checkbox"/> | 22 12 or 21 | 1052 | Advanced | Display Results More | |
| <input type="checkbox"/> | 23 Insect.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 170143 | Advanced | Display Results More | |
| <input type="checkbox"/> | 24 Insects.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 975091 | Advanced | Display Results More | |
| <input type="checkbox"/> | 25 coleoptera*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 161898 | Advanced | Display Results More | |
| <input type="checkbox"/> | 26 pest.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 518225 | Advanced | Display Results More | |
| <input type="checkbox"/> | 27 pests.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 91363 | Advanced | Display Results More | |
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| <input type="checkbox"/> | 29 root worm*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 37 | Advanced | Display Results More | |
| <input type="checkbox"/> | 30 Diabrotica.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 2699 | Advanced | Display Results More | |

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|--------------------------|--|---------|----------|---------------------------------|----------------------|--|
| | (english), title, heading words] | | | | | |
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| <input type="checkbox"/> | 32 D barberi.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 95 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 33 MCR.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 3994 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 34 MCRW.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 0 | Advanced | Save | More | |
| <input type="checkbox"/> | 35 NCRW.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 36 WCRW.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 4 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 37 WCR.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 416 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 38 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 | 1340053 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 39 toleran*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 337681 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 40 resistan*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1146211 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 41 protect*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1114081 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 42 control*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 4414698 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 43 39 or 40 or 41 or 42 | 6283592 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 44 ((Insect or Insects or coleoptera* or pest or pests or rootworm* or root worm* or Diabrotica or D virgifera or D barberi or MCR or MCRW or NCRW or WCRW or WCR) adj2 (toleran* or resistan* or protect* or control*)).mp. | 495169 | Advanced | Display Results | More | |
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| <input type="checkbox"/> | 46 B thuringiensis.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 4256 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 47 44 or 45 or 46 | 502956 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 48 GMO*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 2634 | Advanced | Display Results | More | |
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| <input type="checkbox"/> | 58 transform*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 572942 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 59 manipulat*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 179942 | Advanced | Display Results | More | |
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| <input type="checkbox"/> | 61 engineer*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 523873 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 62 deriv*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1426344 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 63 57 or 58 or 59 or 60 or 61 or 62 | 4709699 | Advanced | Display Results | More | |

| | | | | | | |
|--------------------------|----|--|--------|----------|--|--|
| <input type="checkbox"/> | 64 | ((genetic* or living or biotech*) adj3 (modif* or transform* or manipulat* or improv* or engineer* or deriv*))mp. | 152317 | Advanced | Display Results More | |
| <input type="checkbox"/> | 65 | 48 or 49 or 50 or 51 or 52 or 64 | 461555 | Advanced | Display Results More | |
| <input type="checkbox"/> | 66 | Maize*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 104317 | Advanced | Display Results More | |
| <input type="checkbox"/> | 67 | corn*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 252938 | Advanced | Display Results More | |
| <input type="checkbox"/> | 68 | Zea mays.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 57046 | Advanced | Display Results More | |
| <input type="checkbox"/> | 69 | Z mays.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1945 | Advanced | Display Results More | |
| <input type="checkbox"/> | 70 | 66 or 67 or 68 or 69 | 359018 | Advanced | Display Results More | |
| <input type="checkbox"/> | 71 | Bt.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 19349 | Advanced | Display Results More | |
| <input type="checkbox"/> | 72 | Bacillus thuringiensis.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 18271 | Advanced | Display Results More | |
| <input type="checkbox"/> | 73 | B thuringiensis.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 4256 | Advanced | Display Results More | |
| <input type="checkbox"/> | 74 | 71 or 72 or 73 | 33320 | Advanced | Display Results More | |
| <input type="checkbox"/> | 75 | maize*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 104317 | Advanced | Display Results More | |
| <input type="checkbox"/> | 76 | corn*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 252938 | Advanced | Display Results More | |
| <input type="checkbox"/> | 77 | mays.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 57291 | Advanced | Display Results More | |
| <input type="checkbox"/> | 78 | 75 or 76 or 77 | 359223 | Advanced | Display Results More | |
| <input type="checkbox"/> | 79 | ((Bt or Bacillus thuringiensis or B thuringiensis) adj5 (maize* or corn* or mays)).mp. | 1663 | Advanced | Display Results More | |
| <input type="checkbox"/> | 80 | Btmaize*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 81 | Btcorn*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 82 | 79 or 80 or 81 | 1663 | Advanced | Display Results More | |
| <input type="checkbox"/> | 83 | 65 or 70 | 807463 | Advanced | Display Results More | |
| <input type="checkbox"/> | 84 | 22 and 83 | 299 | Advanced | Display Results More | |
| <input type="checkbox"/> | 85 | 65 and 70 | 13110 | Advanced | Display Results More | |
| <input type="checkbox"/> | 86 | 47 and 85 | 2624 | Advanced | Display Results More | |
| <input type="checkbox"/> | 87 | 4 or 5 or 82 or 84 or 86 | 3554 | Advanced | Display Results More | |
| <input type="checkbox"/> | 88 | limit 87 to yr="2018 -Current" | 237 | Advanced | Display Results More | |

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☐ Microorganisms

☐ New Taxa

☐ Article

☐ Latest Update

☐ Plants

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☐ Review Articles

☐ Human

☐ Animals

☐ Meeting

Publication Year -



Terms were searched individually line by line, however when the proximity operator adj2 is used the Ovid platform displays the terms on one line as a group such as (term,term2,term3)adj2 (term4,term5,term6)



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| <input type="checkbox"/> | 1 | MIR604.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 43 | Advanced | Display Results More | Contract |
| <input type="checkbox"/> | 2 | MIR 604.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 2 | Advanced | Display Results More | |
| <input type="checkbox"/> | 3 | SYN-IR674-5.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 4 | 1 or 2 or 3 | 45 | Advanced | Display Results More | |
| <input type="checkbox"/> | 5 | (Agrisure* adj2 RW*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 6 | mCry3A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 38 | Advanced | Display Results More | |
| <input type="checkbox"/> | 7 | mCry 3A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 8 | mCry 3 A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 9 | Cry3A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 213 | Advanced | Display Results More | |
| <input type="checkbox"/> | 10 | Cry 3A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 7 | Advanced | Display Results More | |
| <input type="checkbox"/> | 11 | Cry 3 A*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1 | Advanced | Display Results More | |
| <input type="checkbox"/> | 12 | 6 or 7 or 8 or 9 or 10 or 11 | 249 | Advanced | Display Results More | |
| <input type="checkbox"/> | 13 | Phosphomannoisomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 4 | Advanced | Display Results More | |
| <input type="checkbox"/> | 14 | Mannose 6-phosphate isomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 120 | Advanced | Display Results More | |
| <input type="checkbox"/> | 15 | Phosphomannoseisomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 16 | Phosphomannose isomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 146 | Advanced | Display Results More | |
| <input type="checkbox"/> | 17 | 9023-88-5.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 18 | AAA24109.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 19 | "EC 5.3.1.8".mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 7 | Advanced | Display Results More | |
| <input type="checkbox"/> | 20 | "E.C. 5.3.1.8".mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 7 | Advanced | Display Results More | |
| <input type="checkbox"/> | 21 | 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 | 225 | Advanced | Display Results More | |
| <input type="checkbox"/> | 22 | 12 or 21 | 473 | Advanced | Display Results More | |
| <input type="checkbox"/> | 23 | Insect.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 402179 | Advanced | Display Results More | |
| <input type="checkbox"/> | 24 | Insects.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 939960 | Advanced | Display Results More | |
| <input type="checkbox"/> | 25 | coleoptera*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 166693 | Advanced | Display Results More | |
| <input type="checkbox"/> | 26 | pest.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 447478 | Advanced | Display Results More | |
| <input type="checkbox"/> | 27 | pests.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 437267 | Advanced | Display Results More | |
| <input type="checkbox"/> | 28 | rootworm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1953 | Advanced | Display Results More | |
| <input type="checkbox"/> | 29 | root worm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 142 | Advanced | Display Results More | |
| <input type="checkbox"/> | 30 | Diabrotica.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 3653 | Advanced | Display Results More | |

| | | | | | | | |
|--------------------------|----|---|---------|----------|---------------------------------|----------------------|--|
| | | identifiers, cabicodes] | | | | | |
| <input type="checkbox"/> | 31 | D virgifera.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 382 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 32 | D barberi.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 144 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 33 | MCR.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 972 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 34 | MCRW.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 35 | NCRW.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 36 | WCRW.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 4 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 37 | WCR.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 386 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 38 | 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 | 1099641 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 39 | toleran*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 237434 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 40 | resistan*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 743133 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 41 | protect*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 540573 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 42 | control*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 2106732 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 43 | 39 or 40 or 41 or 42 | 3084948 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 44 | ((Insect or Insects or coleoptera* or pest or pests or rootworm* or root worm* or Diabrotica or D virgifera or D barberi or MCR or MCRW or NCRW or WCRW or WCR) adj2 (toleran* or resistan* or protect* or control*)).mp. | 211635 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 45 | Bacillus thuringiensis.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 20568 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 46 | B thuringiensis.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 5919 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 47 | 44 or 45 or 46 | 224093 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 48 | GMO*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 65594 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 49 | LMO*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 441 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 50 | GM.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 42125 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 51 | GE.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 6491 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 52 | transgen*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 90036 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 53 | genetic*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 975667 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 54 | living.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 161502 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 55 | biotech*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 226717 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 56 | 53 or 54 or 55 | 1239040 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 57 | modif*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 381776 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 58 | transform*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 211944 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 59 | manipulat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 95378 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 60 | improv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 992585 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 61 | engineer*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 180782 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 62 | deriv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 441257 | Advanced | Display Results | More | |
| <input type="checkbox"/> | 63 | 57 or 58 or 59 or 60 or 61 or 62 | 1938449 | Advanced | Display Results | More | |

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|--------------------------|----|---|--------|----------|--|--|
| <input type="checkbox"/> | 64 | ((genetic* or living or biotech*) adj3 (modif* or transform* or manipulat* or improv* or engineer* or deriv*)).mp. | 138518 | Advanced | Display Results More | |
| <input type="checkbox"/> | 65 | 48 or 49 or 50 or 51 or 52 or 64 | 195537 | Advanced | Display Results More | |
| <input type="checkbox"/> | 66 | Maize*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 325233 | Advanced | Display Results More | |
| <input type="checkbox"/> | 67 | corn*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 408902 | Advanced | Display Results More | |
| <input type="checkbox"/> | 68 | Zea mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 270856 | Advanced | Display Results More | |
| <input type="checkbox"/> | 69 | Z mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 1144 | Advanced | Display Results More | |
| <input type="checkbox"/> | 70 | 66 or 67 or 68 or 69 | 451752 | Advanced | Display Results More | |
| <input type="checkbox"/> | 71 | Bt.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 13932 | Advanced | Display Results More | |
| <input type="checkbox"/> | 72 | Bacillus thuringiensis.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 20568 | Advanced | Display Results More | |
| <input type="checkbox"/> | 73 | B thuringiensis.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 5919 | Advanced | Display Results More | |
| <input type="checkbox"/> | 74 | 71 or 72 or 73 | 28724 | Advanced | Display Results More | |
| <input type="checkbox"/> | 75 | maize*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 325233 | Advanced | Display Results More | |
| <input type="checkbox"/> | 76 | corn*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 408902 | Advanced | Display Results More | |
| <input type="checkbox"/> | 77 | mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 270996 | Advanced | Display Results More | |
| <input type="checkbox"/> | 78 | 75 or 76 or 77 | 451874 | Advanced | Display Results More | |
| <input type="checkbox"/> | 79 | ((Bt or Bacillus thuringiensis or B thuringiensis) adj5 (maize* or corn* or mays)).mp. | 2094 | Advanced | Display Results More | |
| <input type="checkbox"/> | 80 | Btmaize*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 81 | Btcorn*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 82 | 79 or 80 or 81 | 2094 | Advanced | Display Results More | |
| <input type="checkbox"/> | 83 | 65 or 70 | 634060 | Advanced | Display Results More | |
| <input type="checkbox"/> | 84 | 22 and 83 | 258 | Advanced | Display Results More | |
| <input type="checkbox"/> | 85 | 65 and 70 | 13229 | Advanced | Display Results More | |
| <input type="checkbox"/> | 86 | 47 and 85 | 2506 | Advanced | Display Results More | |
| <input type="checkbox"/> | 87 | 4 or 5 or 82 or 84 or 86 | 3488 | Advanced | Display Results More | |
| <input type="checkbox"/> | 88 | limit 87 to yr="2018 -Current" | 118 | Advanced | Display Results More | |

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|--------------------------|-----|---|---------|----------|--|-------------|--------------------------|
| <input type="checkbox"/> | 1 | MIR604.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 21 | Advanced | Display Results More | | Contract |
| <input type="checkbox"/> | 2 | MIR 604.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 5 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 3 | SYN-IR674-5.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | | |
| <input type="checkbox"/> | 4 | 1 or 2 or 3 | 26 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 5 | (Agrisure* adj2 RW*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | | |
| <input type="checkbox"/> | 6 | mCry3A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 29 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 7 | mCry 3 A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | | |
| <input type="checkbox"/> | 8 | mCry 3 A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | | |
| <input type="checkbox"/> | 9 | Cry3A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 144 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 10 | Cry 3A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 2 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 11 | Cry 3 A*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 3 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 12 | 6 or 7 or 8 or 9 or 10 or 11 | 174 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 13 | Phosphomannoisomerase.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 18 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 14 | Mannose 6-phosphate isomerase.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 369 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 15 | Phosphomannose isomerase.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 5 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 16 | Phosphomannose isomerase.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 244 | Advanced | Display Results More | | |

| | | | | | | |
|--------------------------|----|--|--------|----------|--|--|
| <input type="checkbox"/> | 17 | 9023-88-5.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 18 | AAA24109.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 19 | "EC 5.3.1.8".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 18 | Advanced | Display Results More | |
| <input type="checkbox"/> | 20 | "E.C. 5.3.1.8".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 18 | Advanced | Display Results More | |
| <input type="checkbox"/> | 21 | 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 | 469 | Advanced | Display Results More | |
| <input type="checkbox"/> | 22 | 12 or 21 | 643 | Advanced | Display Results More | |
| <input type="checkbox"/> | 23 | Insect.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 118207 | Advanced | Display Results More | |
| <input type="checkbox"/> | 24 | Insects.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 44550 | Advanced | Display Results More | |
| <input type="checkbox"/> | 25 | coleoptera*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 17509 | Advanced | Display Results More | |
| <input type="checkbox"/> | 26 | pest.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 28351 | Advanced | Display Results More | |
| <input type="checkbox"/> | 27 | pests.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 10501 | Advanced | Display Results More | |
| <input type="checkbox"/> | 28 | rootworm*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 529 | Advanced | Display Results More | |
| <input type="checkbox"/> | 29 | root worm*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 3 | Advanced | Display Results More | |
| <input type="checkbox"/> | 30 | Diabrotica.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 541 | Advanced | Display Results More | |
| <input type="checkbox"/> | 31 | D virgifera.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 24 | Advanced | Display Results More | |
| <input type="checkbox"/> | 32 | D barberi.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 20 | Advanced | Display Results More | |
| <input type="checkbox"/> | 33 | MCR.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 3923 | Advanced | Display Results More | |
| <input type="checkbox"/> | 34 | MCRW.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 35 | NCRW.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |

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|--------------------------|----|--|---------|----------|--|--|
| <input type="checkbox"/> | 36 | WCRW.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 4 | Advanced | Display Results More | |
| <input type="checkbox"/> | 37 | WCR.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 220 | Advanced | Display Results More | |
| <input type="checkbox"/> | 38 | 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 | 176425 | Advanced | Display Results More | |
| <input type="checkbox"/> | 39 | toleran*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 313915 | Advanced | Display Results More | |
| <input type="checkbox"/> | 40 | resistan*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 1049553 | Advanced | Display Results More | |
| <input type="checkbox"/> | 41 | protect*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 794291 | Advanced | Display Results More | |
| <input type="checkbox"/> | 42 | control*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 5087500 | Advanced | Display Results More | |
| <input type="checkbox"/> | 43 | 39 or 40 or 41 or 42 | 6520960 | Advanced | Display Results More | |
| <input type="checkbox"/> | 44 | ((Insect or Insects or coleoptera* or pest or pests or rootworm* or root worm* or Diabrotica or D virgifera or D barberi or MCR or MCRW or NCRW or WCRW or WCR) adj2 (toleran* or resistan* or protect* or control*)).mp. | 27580 | Advanced | Display Results More | |
| <input type="checkbox"/> | 45 | Bacillus thuringiensis.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 8336 | Advanced | Display Results More | |
| <input type="checkbox"/> | 46 | B thuringiensis.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 2202 | Advanced | Display Results More | |
| <input type="checkbox"/> | 47 | 44 or 45 or 46 | 33254 | Advanced | Display Results More | |
| <input type="checkbox"/> | 48 | GMO*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 1763 | Advanced | Display Results More | |
| <input type="checkbox"/> | 49 | LMO*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 2230 | Advanced | Display Results More | |
| <input type="checkbox"/> | 50 | GM.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 49438 | Advanced | Display Results More | |
| <input type="checkbox"/> | 51 | GE.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 17679 | Advanced | Display Results More | |
| <input type="checkbox"/> | 52 | transgen*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 203654 | Advanced | Display Results More | |
| <input type="checkbox"/> | 53 | genetic*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 3760648 | Advanced | Display Results More | |
| <input type="checkbox"/> | 54 | living.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 364326 | Advanced | Display Results More | |
| <input type="checkbox"/> | 55 | biotech*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 62356 | Advanced | Display Results More | |

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|--------------------------|--|---------|----------|--|--|--|
| | supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | | | | | |
| <input type="checkbox"/> | 56 53 or 54 or 55 | 4125936 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 57 modif*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 1048262 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 58 transform*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 574416 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 59 manipul*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 183525 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 60 improv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 2287954 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 61 engineer*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 236460 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 62 deriv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 1849623 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 63 57 or 58 or 59 or 60 or 61 or 62 | 5455290 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 64 ((genetic* or living or biotech*) adj3 (modif* or transform* or manipul* or improv* or engineer* or deriv*)).mp. | 146031 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 65 48 or 49 or 50 or 51 or 52 or 64 | 376916 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 66 Maize*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 28840 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 67 corn*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 198928 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 68 Zea mays.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 33946 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 69 Z mays.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 320 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 70 66 or 67 or 68 or 69 | 230909 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 71 Bt.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 13503 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 72 Bacillus thuringiensis.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 8336 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 73 B thuringiensis.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 2202 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 74 71 or 72 or 73 | 19636 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 75 maize*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 28840 | Advanced | Display Results More | | |
| <input type="checkbox"/> | 76 corn*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism | 198928 | Advanced | Display Results More | | |

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|---|----|--|--------|----------|--|--|
| supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | | | | | | |
| <input type="checkbox"/> | 77 | mays.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 34170 | Advanced | Display Results More | |
| <input type="checkbox"/> | 78 | 75 or 76 or 77 | 231093 | Advanced | Display Results More | |
| <input type="checkbox"/> | 79 | ((Bt or Bacillus thuringiensis or B thuringiensis) adj5 (maize* or corn* or mays)).mp. | 742 | Advanced | Display Results More | |
| <input type="checkbox"/> | 80 | Btmaize*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 81 | Btcorn*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] | 0 | Advanced | Save More | |
| <input type="checkbox"/> | 82 | 79 or 80 or 81 | 742 | Advanced | Display Results More | |
| <input type="checkbox"/> | 83 | 65 or 70 | 601056 | Advanced | Display Results More | |
| <input type="checkbox"/> | 84 | 22 and 83 | 147 | Advanced | Display Results More | |
| <input type="checkbox"/> | 85 | 65 and 70 | 6769 | Advanced | Display Results More | |
| <input type="checkbox"/> | 86 | 47 and 85 | 1062 | Advanced | Display Results More | |
| <input type="checkbox"/> | 87 | 4 or 5 or 82 or 84 or 86 | 1369 | Advanced | Display Results More | |
| <input type="checkbox"/> | 88 | limit 87 to yr="2018 -Current" | 122 | Advanced | Display Results More | |

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