



**Review of Scientific Literature Relevant to the  
Food/Feed and Environmental Risk Assessment of  
MIR162 Maize**

**Literature Review**

**TEST GUIDELINE(S):**

Not Applicable

**AUTHOR(S):**



**COMPLETION DATE:**

October 27, 2021

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**LABORATORY PROJECT ID:**

Report Number: SSB-107-21

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## STATEMENT OF DATA CONFIDENTIALITY CLAIMS

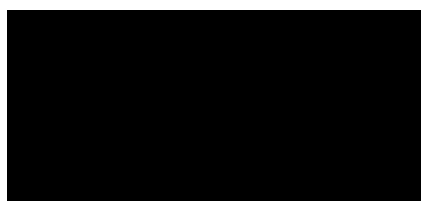
*The following statement applies to submissions to the United States Environmental Protection Agency (US EPA).*

### Statement of No Data Confidentiality Claim

No claim of confidentiality is made for any information contained in this report on the basis of its falling within the scope of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 10 (d) (1) (A), (B), or (C).

**Company:** *Syngenta Seeds, LLC*

**Company Representative:**

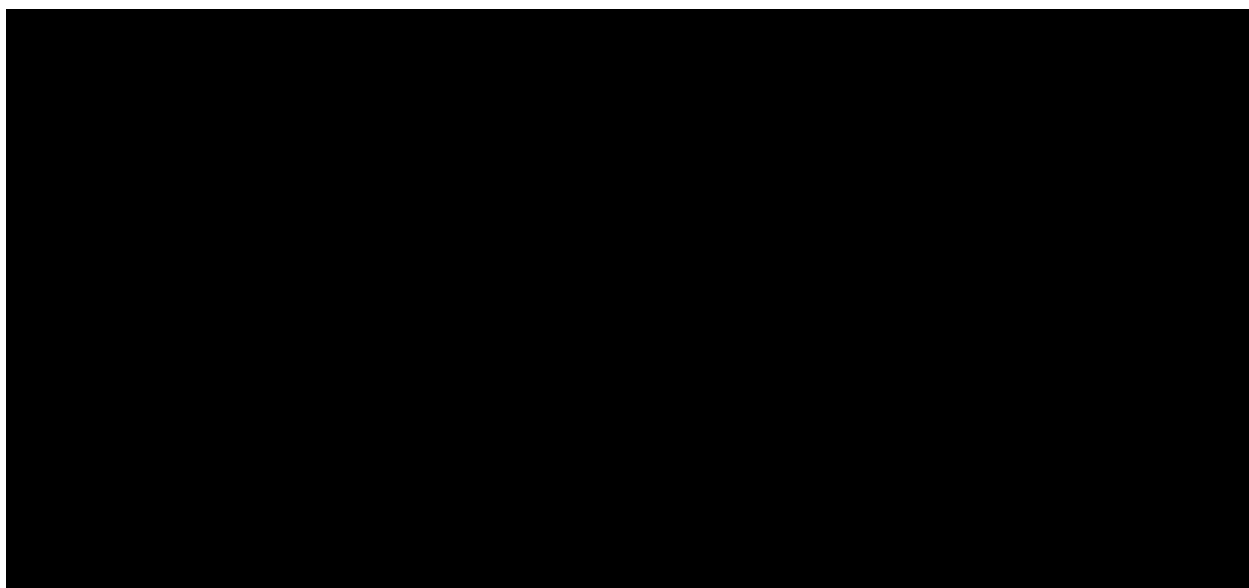


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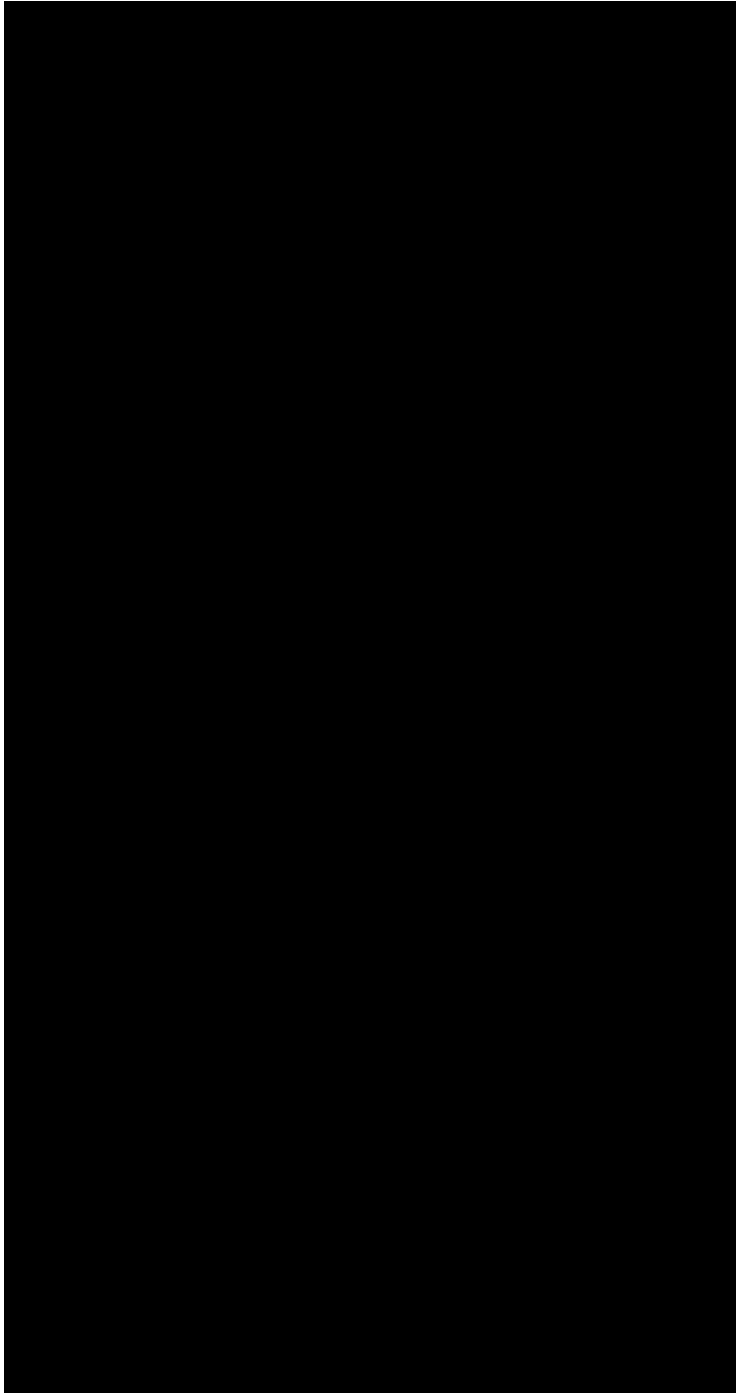
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## GOOD LABORATORY PRACTICE COMPLIANCE STATEMENT

This is not a study as defined by 40 CFR Part 160.3 and is therefore not subject to Federal Insecticide, Fungicide, and Rodenticide Act Good Laboratory Practice Standards (GLPS; US EPA, 1989). However, all components of this analysis were performed according to accepted scientific practices, and relevant records have been retained.



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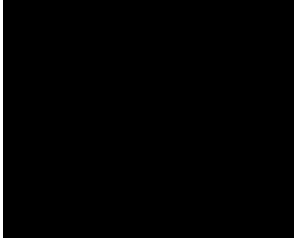
Date

GENERAL INFORMATION

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## **TABLE OF CONTENTS**

<b>STATEMENT OF DATA CONFIDENTIALITY CLAIMS</b>	<b>2</b>
<b>GOOD LABORATORY PRACTICE COMPLIANCE STATEMENT</b>	<b>3</b>
<b>GENERAL INFORMATION</b>	<b>4</b>
<b>TABLE OF CONTENTS</b>	<b>5</b>
<b>LIST OF TABLES</b>	<b>6</b>
<b>LIST OF ACRONYMS AND ABBREVIATIONS</b>	<b>8</b>
<b>1.0 EXECUTIVE SUMMARY</b>	<b>9</b>
<b>2.0 METHODS</b>	<b>9</b>
2.1 Objective of the Scoping Review .....	9
2.2 Formulating Review Questions and Clarifying Their Purpose .....	10
2.2.1 Review Question .....	10
2.2.2 Eligibility/Inclusion Criteria .....	10
<b>3.0 SEARCHING FOR/IDENTIFYING RELEVANT PUBLICATIONS</b>	<b>15</b>
3.1 Electronic Bibliographic Databases .....	15
3.2 Internet Searches .....	15
3.2.1 Key organizations.....	15
3.2.2 Web-based Search Engines and Databases .....	16
3.2.3 Manual Searches .....	16
3.2.3.1 Checking Reference Lists .....	16
3.2.3.2 Hand Searching .....	16
3.2.3.3 Citation Searching.....	16
3.3 Constructing the Search Strategy .....	16
3.3.1 Database Searching .....	16
3.3.1.1 Approaches to Develop Searches.....	16
3.3.1.2 Search Terms.....	16
3.3.1.3 Free-text Searching Functions.....	18
3.3.1.4 Search Strings .....	18
3.3.1.5 Key Elements of Review Questions to Use for Best Results.....	18
3.3.1.6 Use of Multiple Languages .....	19
3.3.1.7 Time Period.....	19
3.3.1.8 Internet Searching of Regulatory Agency Webpages .....	20
3.4 Reference Publications.....	20
<b>4.0 SUMMARIZING AND REPORTING THE DATA</b>	<b>20</b>

4.1	Selecting Publications .....	20
4.1.1	Database Records .....	20
4.1.2	Internet Records from Key Organizations .....	21
4.2	Results of the Publication Selection Process .....	22
4.3	Relevant Publications.....	22
4.4	Excluded Publications After Detailed Assessment of Full-Text Documents .....	22
4.5	Unobtainable Publications .....	22
4.6	Unclear Publications .....	22
4.7	Full-Text Documents .....	23
4.8	Implications of Relevant Publications on Risk Assessment .....	23
<b>5.0</b>	<b>REFERENCES</b>	<b>31</b>
	<b>APPENDIX SECTION</b>	<b>32</b>
	APPENDIX A Search History and Subject Indexing .....	33

## LIST OF TABLES

TABLE 1	Review Question in PICO/PECO Structure.....	10
TABLE 2	Eligibility/inclusion Criteria to Establish Relevance .....	11
TABLE 3	Overview of Main Categories of Information/Data Requirements.....	13
TABLE 4	Key Organization Pages Included in the Search .....	15
TABLE 5	Search String Strategy.....	19
TABLE 6	Nomenclature For the Single Event and Newly Expressed Proteins from the ISAAA Database for use in Searching Regulatory Agency Web Pages.....	20
TABLE 7	Electronic Bibliographic Database Search Results .....	24
TABLE 8	Regulatory Agency Webpage Search Details .....	25
TABLE 9	Results of the Publication Selection Process, for Each Review Question and or Group of Information/data Requirements Searched .....	26
TABLE 10	Report of all Relevant Publications Retrieved After Detailed Assessment of Full-text Database Documents for Relevance.....	27
Table 11	Report of all the Publications Excluded from the Risk Assessment After Detailed Assessment of Full-text Database Documents .....	27
TABLE 12	Report of the Reliability and Implications for the Risk Assessment of all Relevant Publications Retrieved after Detailed Assessment of Full-text Database Documents .....	28
TABLE 13	Report of all Relevant Publications Retrieved After Detailed Assessment of Full-text Internet Documents for Relevance.....	28
TABLE 14	Report of all the Publications Excluded from the Risk Assessment After Detailed Assessment of Full-text Internet Documents .....	29

Table 15                      Report of the Reliability and Implications for the Risk Assessment of  
all Relevant Publications Retrieved after Detailed Assessment of Full-  
text Internet Documents .....30

## **LIST OF ACRONYMS AND ABBREVIATIONS**

CAB	Commonwealth Agricultural Bureaux
EFSA	European Food Safety Authority
ERA	Environmental Risk Assessment
EU	European Union
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GMO	Genetically Modified Organism
ISAAA	International Service for the Acquisition of Agri-Biotech Applications
MEDLINE	MEDical Literature Analysis and Retrieval System Online
NA	Not Applicable
NTO	Nontarget organism
PICO/PECO	Population, Intervention/Exposure, Comparator, Outcomes
PMEM	Post-Market Environmental Monitoring
PMI	phosphomannose isomerase

## 1.0 EXECUTIVE SUMMARY

Syngenta has developed maize (*Zea mays* L., corn) line derived from transformation event MIR162.

A systematic literature search and scoping review for the MIR162 maize was conducted following the requirements of the European Food Safety Authority (EFSA) technical note on literature searching to GMO risk assessment guidance in the context of an annual post-market environmental monitoring (PMEM) report on GMOs (EFSA 2019).

A broad literature search was performed using a pre-defined comprehensive search strategy over a collection of bibliographic databases, covering a database entry period from June 01, 2020 to July 01, 2021. A total of four public databases based on their coverage of scientific literature were searched via Ovid search interface. The records were de-duplicated after combining records retrieved from all the databases to generate unique references. Similarly, the internet pages of regulatory agencies and risk assessment bodies that are involved in the risk assessment of GMOs and post their risk assessments on their websites were searched.

This literature search identified a total of 201 records from database search, of which 200 were excluded at the title review stage and 1 record was found relevant after the full-text review stage. Similarly, the literature search identified a total of 16 records from the internet search, of which 15 records were excluded at the full-text review stage and 1 record was found relevant. The assessment of the relevant information obtained from these records does not change the risk assessment for MIR162 maize.

Therefore, the literature search results, and review support the existing safety assessment of the MIR162 maize.

## 2.0 METHODS

### 2.1 Objective of the Scoping Review

The objective of this systematic literature search and scoping review was to search scientific publications in order to collect, identify, and assess evidence that is relevant to the risk assessment of MIR162 maize in the context of an annual post-market environmental monitoring (PMEM) report on GMOs authorized in the EU market.

Syngenta developed maize plants derived from transformation event MIR162 contain the transgene *vip3Aa20*, which encodes the insecticidal protein Vip3Aa20, and the transgene *pmi*, which encodes the enzyme phosphomannose isomerase (PMI). Vip3Aa20 is a variant of the native Vip3Aa1 protein from the soil bacterium *Bacillus thuringiensis* strain AB88, and is active against certain lepidopteran pests of maize, including *Spodoptera frugiperda* and *Helicoverpa zea*. 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 MIR162 maize.

## 2.2 Formulating Review Questions and Clarifying Their Purpose

### 2.2.1 Review Question

The review question associated with this literature search was:

Do either food/feed products derived from MIR162 maize or the intended traits have adverse effects on human and animal health and/or the environment?

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

**TABLE 1            Review Question in PICO/PECO Structure**

<b>Element</b>	<b>Components of Review Question</b>
<u>P</u> opulation	Human and animal health, and the environment
<u>I</u> ntervention/ <u>E</u> xposure	MIR162 maize, derived food/feed products, Vip3Aa20, and phosphomannose isomerase (PMI) proteins and closely related variants
<u>C</u> omparator	conventional counterpart (if applicable)
<u>O</u> utcome	adverse effects

### 2.2.2 Eligibility/Inclusion Criteria

High level key concepts for inclusion/exclusion criteria intended to establish relevance of retrieved records are provided in the order of importance or ease of finding information on the criteria within a publication (Table 2). The first failed eligibility/inclusion criterion was used as the primary reason for exclusion, and the remaining criteria were not assessed.

Expert knowledge on data used in the risk assessment of the GMO is required. Some examples of relevant data/information on the information/data requirements concept included in Table 2 are listed in Table 3. If certain data are considered event-specific or specific to the transgenic protein expressed in MIR162 maize, it is noted. If the record does not contain enough information to determine if the protein being evaluated is a closely related variant then, it will be included.

**TABLE 2 Eligibility/inclusion Criteria to Establish Relevance**

<b>Concepts</b>	<b>Criteria</b>	<b>Comment</b>
Intervention/exposure	MIR162 maize, derived food/feed products, and/or the intended or closely related trait(s)	Intended traits include lepidopteran insect resistance and mannose metabolism. Closely related variants of Vip3Aa20 (i.e., those that share the same secondary level of Crickmore nomenclature) were included as relevant. Any records on enzymes classified as PMI will be considered relevant.
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 MIR162 maize (information/data requirements provided in Table 3) will be considered relevant. Publications addressing issues such as benefits, socio-economics, ethics, crop protection, detection methods, efficacy, public perception, and risk communication will be 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	Publications must address pathways and levels of exposure relevant to the scope of the application: import and processing of MIR162 maize for food/feed uses.
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., editorials, reviews, position papers) will be excluded. Risk assessments performed and reported by relevant key organizations will be included if they address MIR162 maize, Vip3Aa20, or PMI.
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 will be excluded. Any cited/referenced publications contained within documents produced by EFSA and/or its GMO Panel will be excluded.
Access	Full-text document is accessible	If potentially relevant full-text documents cannot be obtained, then they will be listed in a table with a description of the (unsuccessful) methods 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 will be considered relevant.
Outcomes	Effects/impacts on human and animal health, and/or the environment are addressed	Publications that address MIR162 maize need to address effects/impacts on entities of concern, and potential determinants of exposure that place these entities at risk in order to be relevant to the risk assessment of MIR162 maize
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 MIR162 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 will be addressed in the assessment of the publication.
Plant species	The publication may address the same plant species as the GMO under consideration, but could also address any plant species producing the Vip3Aa20 or PMI proteins.	The review question addresses the safe use of the intended trait(s) of MIR162 maize. Therefore, GMOs that contain Vip3Aa20 or PMI or closely related variants, but are introduced into another plant species may be included. For certain types of data, the presence of the transgenic proteins in a different plant species will not impact the assessment of MIR162 maize. Those types of data are identified as event specific 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 will be 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 will be excluded at the initial screening stage. Only one copy of a study will be presented even if it is reported in different publications.



**TABLE 3 Overview of Main Categories of Information/Data Requirements**

<b>Information/data requirement</b>	<b>Non-exhaustive list of specific information/data requirements</b>
Molecular characterization of the genetic modification of the GMO	<ul style="list-style-type: none"> <li>• Information on the insert including: sequence, size, copy number, genetic element arrangement, deletions, location, sequence similarity searches, and analysis of open reading frames (MIR162 maize only)</li> <li>• Expression data of inserted/modified sequences (MIR162 maize only)</li> <li>• Genetic stability (MIR162 maize only)</li> <li>• Molecular and biochemical characterization of the protein(s) such as: primary structure, molecular weight, post-translational modifications (Vip3Aa20 or PMI as expressed in MIR162 maize only)</li> <li>• Assessment of enzymatic activity including substrate specificity and reaction products with respect to safety and/or nutritional balance</li> <li>• Data on the equivalence between plant-produced and microbially-produced proteins (Vip3Aa20 or PMI from MIR162 maize plants and a microbial source)</li> </ul>
Agronomic, phenotypic and compositional characterization of the GM plant	<ul style="list-style-type: none"> <li>• Comparative assessment of agronomic and phenotypic characteristics under field or controlled conditions (MIR162 maize only)</li> <li>• Comparative analysis of key nutritional constituents (MIR162 maize)</li> </ul>
Toxicological assessment of newly expressed protein(s), new constituents other than proteins, and the whole GM food/feed	<ul style="list-style-type: none"> <li>• Amino acid sequence comparison between the newly expressed protein(s) (Vip3Aa20 or PMI as expressed in MIR162 maize only) and toxic proteins</li> <li>• Stability of the protein(s) under relevant processing and storage conditions</li> <li>• Investigation of proteolytic susceptibility of the newly expressed protein</li> <li>• Toxicity studies</li> <li>• Feeding studies that used plant material (MIR162 maize only)</li> </ul>
Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity	<ul style="list-style-type: none"> <li>• Amino acid sequence comparison between the newly expressed protein(s) and known allergens or celiac disease peptide sequences (Vip3Aa20 or PMI as expressed in MIR162 maize only)</li> <li>• Serum screening</li> <li>• Pepsin susceptibility testing</li> <li>• <i>In vivo</i> tests in animal models</li> <li>• Expression data for endogenous allergens (MIR162 maize only)</li> <li>• Comparison of newly expressed proteins to known strong adjuvants</li> </ul>
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"> <li>• Anticipated dietary intake of food/feed from MIR162 maize and the resulting nutritional impact</li> <li>• Comparative growth performance studies with young rapidly growing animal species (MIR162 maize only if the diet contains transgenic plant material)</li> </ul>
Post-market monitoring	<ul style="list-style-type: none"> <li>• 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</li> <li>• Information on the reliability, sensitivity and specificity of the post market monitoring</li> </ul>

Information/data requirement	Non-exhaustive list of specific information/data requirements
Persistence and invasiveness assessment, including plant-to-plant gene transfer	<ul style="list-style-type: none"> <li>Measurements of volunteer occurrence and establishment (MIR162 maize)</li> <li>Replacement capacity (i.e., # of plants present at specific observation time/# of plants present after initial sowing) (MIR162 maize only)</li> <li>Fitness of the GM plant expressing Vip3Aa20 or PMI in various environmental conditions – in the same or in a different plant species may be considered relevant.</li> </ul>
Assessment of plant to micro-organism gene transfer	<ul style="list-style-type: none"> <li>Homology searches at nucleotide level between the GM event and microorganisms. (MIR162 maize only)</li> </ul>
Assessment of interactions with target organisms	<ul style="list-style-type: none"> <li>Excluded based on the scope of the application. The scope of this application covers the import, processing, and food and feed use of MIR162 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, MIR162 maize is not relevant for this application.</li> </ul>
Assessment of interactions with nontarget organisms (NTO)	<ul style="list-style-type: none"> <li>The EFSA ERA Guidance (EFSA, 2010) states that: “<i>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)...</i>”. 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.</li> </ul>
Assessment of interactions with biogeochemical and abiotic processes	<ul style="list-style-type: none"> <li>Excluded based on the scope of the application. The scope of this application covers the import, processing and food and feed use of MIR162 maize in the EU. According to the EFSA ERA Guidance (EFSA, 2010): “<i>Applications concerning food/feed use 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 MIR162 maize on biogeochemical processes resulting from specific cultivation, management, and harvesting techniques is not relevant given the scope of this application.</li> </ul>
Assessment of impact of specific cultivation, management, and harvesting techniques	<ul style="list-style-type: none"> <li>Excluded based on the scope of the application. The scope of this application covers the import, processing, and food and feed use of MIR162 maize in the EU. Cultivation of MIR162 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 MIR162 maize is not relevant for this application.</li> </ul>
Risk mitigation	<ul style="list-style-type: none"> <li>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 MIR162 maize.</li> </ul>
Post-market environmental monitoring	<ul style="list-style-type: none"> <li>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 MIR162 maize.</li> </ul>

### 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) was used. A total of four public databases including MEDical Literature Analysis and Retrieval System Online (Medline), Agricola, Commonwealth Agricultural Bureaux (CAB) Abstracts, and BIOSIS Previews® were searched via Ovid search interface (provided by Ovid Technologies). Each of the databases has a thesaurus. 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. The document types in these databases include journal articles, technical letters and notes, conference proceedings, book chapters, reports, and articles in press.

Due to the use of multiple (i.e., 4) multi-disciplinary databases and redundancy in coverage it is unlikely that late edition of a publication would be missed.

#### 3.2 Internet Searches

##### 3.2.1 Key organizations

The internet pages of regulatory agencies and risk assessment bodies that are involved in the risk assessment of GMOs and post their risk assessments on their websites (Table 4) were searched for documents related to MIR162 maize.

**TABLE 4 Key Organization Pages Included in the Search**

Regulatory agency/risk assessment body	Web address
Food Standards Australia New Zealand	<a href="http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx">http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx</a>
Health Canada <sup>a</sup>	<a href="https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html">https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html</a>
Ministry of Agriculture, Forestry and Fisheries	<a href="http://www.maff.go.jp/e/">http://www.maff.go.jp/e/</a>
Ministry of Environment, Forest and Climate change	<a href="http://moef.gov.in/">http://moef.gov.in/</a>
National Technical Commission on Biosafety <sup>b</sup>	<a href="http://ctnbio.mcti.gov.br/">http://ctnbio.mcti.gov.br/</a>
Office of the Gene Technology Regulator	<a href="http://www.ogtr.gov.au/">http://www.ogtr.gov.au/</a>
US Department of Agriculture	<a href="https://www.aphis.usda.gov/aphis/ourfocus/biotechnology">https://www.aphis.usda.gov/aphis/ourfocus/biotechnology</a>
US Environmental Protection Agency	<a href="https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated">https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated</a>
US Food and Drug Administration	<a href="https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon">https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon</a>

<sup>a</sup>Also searches Environment and Climate Change Canada (<https://www.canada.ca/en/environment-climate-change.html>) and Canadian Food Inspection Agency (<http://www.inspection.gc.ca/plants/plants-with-novel-traits/notices-of-submission/eng/1300143491851/1300143550790>).

<sup>b</sup>Reports that reflect individual reviewer opinions are excluded from evaluation since they are considered when developing the official final opinion of the agency.

Note: Regulatory agencies in Mexico (Intersecretarial Commission on Biosafety of GMOs) and Argentina (National Advisory Commission on Agriculture Biotechnology) do not post the relevant document types on their respective agency websites, and were not searched.

### **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**

Reviews of methodological publications, guidelines, and scientific opinions from regulatory agencies were retrieved using the search strategy and no documents were classified as relevant to the review question.

#### **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 indicated 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 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.<sup>1</sup>

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 was

<sup>1</sup>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.

not necessary to search each exact controlled phrase in order to return all references for each of the specific headings.

Appendix A provides 1) the search history (including the full strategy used and fields searched as run in the database) and the 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 Results**

A very large number of publications were returned using only the four key elements of Event, Intended trait, newly expressed protein(s), 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(s) OR Trade Name) or (Event OR Trade name OR ((Intended Trait OR Newly Expressed Protein(s)) 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 Protein(s), 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 AND (GMO general OR Plant species)) OR (Intended trait - insecticidal AND (GMO general AND Plant species)) OR GMO general × Intended trait

The search strategy employed captured literature relevant to MIR162 maize (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	Key Elements
1	Topic	MIR162 OR MIR 162 OR SYN-IR162-4	Event MIR162
2	Topic	Agrisure* ADJ2 Viptera*	Trade name for MIR162
3	Topic	Vip3AA20* OR Vip3 AA20* OR Vip3 AA 20* OR Vip3A A 20*	Newly expressed protein in MIR162 (insecticidal)
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 MIR162 (selectable marker)
5		#3 OR #4	
6	Topic	(Insect OR Insects OR lepidoptera* OR pest OR pests OR noctuidae OR earworm* OR ear worm* OR armyworm* OR army worm* OR cutworm* OR cut worm* OR Helicoverpa OR H zea OR Spodoptera OR S frugiperda OR S exigua OR Striacosta OR S albicosta OR Agrotis OR A ipsilon OR Feltia OR F jaculifera OR Pseudaletia OR P unipuncta OR CEW OR FAW OR WBC) 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 manipulat* 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 protein AND (GMO general OR Plant species)) OR (Intended trait - insecticidal AND (GMO general AND Plant species)) OR GMO general × Intended trait

### 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 names that do not use words in the English language, translations are unlikely to exist.

### 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 edition of a publication would be missed. Therefore, the returned

literature was limited to that which was published between June 1, 2020 and the date of the last database update prior to the search. Searches were executed on or after July 1, 2021.

Internet websites were searched, and the results were manually excluded if the records were dated outside the period of June 1, 2020 and the date the search was conducted. Searches were executed on or after July 1, 2021. If a date was undetermined on an internet website or result record, the result(s) was reviewed using the criteria in Tables 2 and 3.

### 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 was collected.

Internet websites were searched and the results were manually excluded if the records were dated outside the period of June 1, 2020 until July 1, 2021. If a date was undetermined on an internet website or result record, the results were reviewed using the criteria in Tables 2 and 3.

**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
MIR162	MIR162	Event name
MIR162	Vip3Aa20	Newly expressed protein
MIR162	Phosphomannose isomerase	Newly expressed protein

## 3.4 Reference Publications

The search strategy is the same as the one that was previously validated with reference publications [REDACTED]

## 4.0 SUMMARIZING AND REPORTING THE DATA

### 4.1 Selecting Publications

#### 4.1.1 Database Records

The process for selecting relevant publications is conducted in two stages. The first stage, Stage 1 requires a preliminary assessment of titles and abstracts. Those records that are clearly not relevant from reviewing the title only are excluded from further review. For those records that appear relevant or have unclear relevance, the abstracts are reviewed. A kappa test is performed after the Stage 1 review and before any discussion of abstracts over which there was disagreement by the reviewers. Those records that are clearly not relevant from reviewing the abstract are excluded from further review, while records that are relevant or have unclear relevance are reviewed in Stage 2.



Full-length articles are reviewed in Stage 2. An explanation of exclusion is provided for any full-length records that are deemed not relevant in Stage 2. Any relevant records identified in Stage 2 are subjected to reliability assessment and evaluation of the implications of the record on the food and feed, or environmental risk assessments.

Two independent reviewers examined the records for inclusion/exclusion for each eligible information/data requirement at all stages of review. During the preliminary assessment process (Stage 1), only records that were deemed clearly not relevant by all reviewers were excluded from further review. This conservative approach ensured that all potentially relevant records were evaluated until they were deemed to be either relevant or clearly not relevant in Stage 2. Following the Stage 1 reviews, reviewers scored the records as either 1) relevant or unclear relevance, 2) clearly not relevant.

#### **4.1.2 Internet 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 sponsored by the key organization. The regulatory agency webpages that were searched do not post primary data; therefore, all other document types were not considered relevant. The eligibility/inclusion criteria do not include risk assessments/dossiers submitted to regulatory authorities, only risk assessments performed and reported by relevant key organizations. Documents must have been authored by the key organizations and not the applicants to qualify as relevant.

The format of records returned from regulatory agency websites does not often meet those (i.e., title and abstract is not often provided) required to assess them using the 2-stage process followed for the database records. Those websites at which the records are published in English were assessed by two independent reviewers. Due to their format, internet full-text documents were assessed to determine their relevance in stage 2 only. For those websites where the records are not published in English, the results were translated into English and two independent reviewers determined if it met the criteria for inclusion.

The rationale for exclusion was provided only when records were classified as one of the relevant document types and were authored by the agency and excluded based on other eligibility criteria.

The following process applied to the types of internet agency documents described below. We defined a unique internet record, for the purpose of reporting the statistics, as a unique URL. Documents clearly labeled as draft or with a line for a signature that is blank were not reviewed and were classified as not relevant. If the URLs for two documents were identical except for file format (e.g., pdf versus .doc or .docx), one of the documents was considered a duplicate document and it was excluded from statistical accounting. For the group of relevant records, it was confirmed that there were no duplicate records in that group by visual examination.

## **4.2 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 across all databases was recorded (Table 7). The records were de-duplicated after combining records retrieved from all the databases. Additionally, the line-by-line strategy with the number of publications identified per line was presented in the final report. See Appendix A.

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 8). The results of the selection process from both database and internet searches are recorded in Table 9.

Of the 201 records reviewed from the databases at Stage 1, both the reviewers agreed to exclude 200 records. This yielded a kappa test score of 0. Because of the format of documents retrieved from internet searching of key organizations (i.e., title and abstract is not often provided) the kappa test was conducted only on the output of the database search. For the remaining 1 record reviewed from the databases at Stage 2, both the reviewers agreed on the record to be relevant (Table 10) and no record was excluded (Table 11).

Of the 16 records reviewed from the internet search at Stage 2, both the reviewers agreed to exclude 15 records (Table 14). For the remaining 1 record reviewed from the internet search at stage 2, both the reviewers agreed on the record to be relevant (Table 13). The information obtained from these records does not change the risk assessment for MIR162 maize.

## **4.3 Relevant Publications**

There was 1 relevant full-text document retrieved from the database and internet search respectively. A list of the full bibliographic references for all relevant internet publications, ordered by category of information/data requirement is recorded in Tables 10 and 13.

## **4.4 Excluded Publications After Detailed Assessment of Full-Text Documents**

A list of references for all excluded studies (if any) retrieved from database and internet searching after detailed assessment of full-text documents for relevance (i.e. stage 2), with justification for their exclusion, is recorded in Tables 11 and 14.

## **4.5 Unobtainable Publications**

No publications were considered unobtainable.

## **4.6 Unclear Publications**

No publications were considered unclear.

#### **4.7 Full-Text Documents**

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

#### **4.8 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.

The information obtained from the relevant records does not change the risk assessment for MIR162 maize. Therefore, the literature search results, and review support the existing safety assessment of the MIR162 maize.

The record reliability and its implication on the risk assessment was recorded in Tables 12 and 15.

**TABLE 7      Electronic Bibliographic Database Search Results**

Database	Search Date dd/mm/yyyy	Service provider	Date span of the search dd/mm/yyyy <sup>a</sup>	Any limits applied to the search	Number of records retrieved <sup>b</sup>
Agricola	09/07/2021	Ovid Technologies	01/06/2020– 01/07/2021	Dates	66
BIOSIS Previews	09/07/2021	Ovid Technologies	01/06/2020– 01/07/2021	Dates	211
CAB Abstracts	09/07/2021	Ovid Technologies	01/06/2020– 01/07/2021	Dates	136
Medline	09/07/2021	Ovid Technologies	01/06/2020– 01/07/2021	Dates	148
Total					561

<sup>a</sup>Ovid only allows results to be limited by year. The frequency of database update varies. Ovid has provided us with the following update information: Agricola updated monthly on the 1<sup>st</sup> of the month, BIOSIS Previews updated weekly on Mondays, CAB Abstracts updated weekly on Mondays and Medline updated daily.

<sup>b</sup> The results were de-duplicated after combining records retrieved from all the databases.

**TABLE 8 Regulatory Agency Webpage Search Details**

Regulatory agency name	URL	Date of search dd/mm/yyyy	Date of most recent website update dd/mm/yyyy	Date span of search <sup>a</sup>	Total number of records retrieved after removing duplicates	Number of relevant records
Food Standards Australia New Zealand	<a href="http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx">http://www.foodstandards.gov.au/consumer/gmfood/applications/Pages/default.aspx</a>	23/07/2021	NA	No Limitations	6	1
Health Canada <sup>b</sup>	<a href="https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html">https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html</a>	21/07/2021	21/04/2021	No Limitations	3	0
Ministry of Agriculture, Forestry and Fisheries	<a href="http://www.maff.go.jp/e/">http://www.maff.go.jp/e/</a>	07/07/2021	NA	No Limitations	2	0
Ministry of Environment, Forest and Climate change	<a href="http://moef.gov.in/">http://moef.gov.in/</a>	16/07/2021	NA	No Limitations	0	0
National Technical Commission on Biosafety <sup>c</sup>	<a href="http://ctnbio.mcti.gov.br/">http://ctnbio.mcti.gov.br/</a>	01/07/2021	NA	No Limitations	1	0
Office of the Gene Technology Regulator	<a href="http://www.ogtr.gov.au/">http://www.ogtr.gov.au/</a>	16/07/2021	NA	No Limitations	0	0
US Department of Agriculture	<a href="https://www.aphis.usda.gov/aphis/ourfocus/biotechnology">https://www.aphis.usda.gov/aphis/ourfocus/biotechnology</a>	20/07/2021	NA	No Limitations	4	0
US Environmental Protection Agency	<a href="https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated">https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated</a>	20/07/2021	14/07/2021	No Limitations	0	0
US Food and Drug Administration	<a href="https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon">https://www.accessdata.fda.gov/scripts/fdcc/?set=Biocon</a>	21/07/2021	21/07/2021	No Limitations	0	0

<sup>a</sup>Records published prior to June 1, 2020 were manually excluded (if any).

<sup>b</sup> Searching these two websites leads to the same documents as the document results from the Health Canada website Environment and Climate Change Canada (<https://www.canada.ca/en/environment-climate-change.html>) and Canadian Food Inspection Agency (<http://www.inspection.gc.ca/plants/plants-with-novel-traits/notices-of-submission/eng/1300143491851/1300143550790>)

<sup>c</sup>Partial reports are excluded from review and statistics since there is no new information contained in these reports and they are not the official final opinion of the agency.

NA=Not Applicable

**TABLE 9      Results of the Publication Selection Process, for Each Review Question and or Group of Information/data Requirements Searched**

<b>Review question and/or category of information/data requirement(s) captured in the search</b>	<b>Subcategories</b>	<b>Number of publications</b>
Publications identified after all <sup>a</sup> searches of the scientific literature (excluding duplicates*)	Databases	201
	Internet	16
	Manual	0
	<b>Total</b>	217
Publications excluded from the search results after screening of title and abstracts (stage 1)	Databases	200
	Internet <sup>b</sup>	NA
	Manual	0
	<b>Total</b>	200
Publications screened using full-text (stage 2)	Databases	1
	Internet	16
	Manual	0
	<b>Total</b>	17
Publications excluded after full-text screening	Databases	0
	Internet	15
	Manual	0
	<b>Total</b>	15
Unobtainable / Unclear publications	Unobtainable	0
	Unclear	0
	<b>Total</b>	0
Publications considered relevant	Databases	1
	Internet	1
	References	0
	<b>Total</b>	2

\* A total of 561 publications were identified for the database search, of them 360 publications were duplicates and were removed.

<sup>a</sup> Both from electronic bibliographic databases and other sources of scientific literature.

<sup>b</sup> Internet results are not screened at stage 1 because they have no title or abstract.

NA=Not Applicable

**TABLE 10      Report of all Relevant Publications Retrieved After Detailed Assessment of Full-text Database Documents for Relevance**

List of bibliographic references for all publications excluded from the risk assessment, classified by authors			
Study author(s) and year	Title	Source	Reason(s) for exclusion based on eligibility/inclusion criteria table
No publications in this category			

**Table 11      Report of all the Publications Excluded from the Risk Assessment After Detailed Assessment of Full-text Database 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
Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity	Herman <i>et. al.</i> 2021	History of safe exposure and bioinformatic assessment of phosphomannose-isomerase (PMI) for allergenic risk	Transgenic Research

**TABLE 12 Report of the Reliability and Implications for the Risk Assessment of all Relevant Publications Retrieved after Detailed Assessment of Full-text Database 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)	Summary of reliability appraisal	Implications for the risk assessment
Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity	Herman <i>et. al.</i> 2021	Not assignable because this document is an assessment and not an original study	This document is a risk assessment. Risk assessment describes bioinformatics analyses identified an eight-amino acid contiguous match between PMI and a frog parvalbumin allergen (CAC83047.1). Short amino acid matches have been shown to be a poor predictor of allergen cross-reactivity. The match was shown to be of negligible risk of causing cross-reactivity with known allergens and confirmed past results for the PMI sequence. Also, PMI has been expressed in commercialized genetically engineered crops since 2010 with no known reports of allergy. Therefore, the information does not change the conclusion of the risk assessment of MIR162 maize.

**TABLE 13 Report of all Relevant Publications Retrieved After Detailed Assessment of Full-text Internet Documents for Relevance**

List of 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
Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity	Food Standards Australia New Zealand (FSANZ 2020)	A1202_SD1	<a href="https://www.foodstandards.gov.au/code/applications/Documents/A1202%20SD1.pdf">https://www.foodstandards.gov.au/code/applications/Documents/A1202%20SD1.pdf</a>



**TABLE 14**      **Report of all the Publications Excluded from the Risk Assessment After Detailed Assessment of Full-text Internet Documents**

List of references for publications excluded from the risk assessment, classified by authors			
Study (Author(s) and year)	Title	Source	Reason(s) for exclusion based on eligibility/inclusion criteria table
Food Standards Australia New Zealand (2020)	A1202 CFS	<a href="https://www.foodstandards.gov.au/code/applications/Documents/A1202%20CFS.pdf">https://www.foodstandards.gov.au/code/applications/Documents/A1202%20CFS.pdf</a>	Information/data requirements
Food Standards Australia New Zealand (2021)	A1202_Approval Report post Board	<a href="https://www.foodstandards.gov.au/code/changes/circulars/Documents/A1202_Approval%20Report%20post%20Board.pdf">https://www.foodstandards.gov.au/code/changes/circulars/Documents/A1202_Approval%20Report%20post%20Board.pdf</a>	Information/data requirements
Food Standards Australia New Zealand (2021)	Applications and current status	<a href="https://www.foodstandards.gov.au/consumer/gmfood/applications">https://www.foodstandards.gov.au/consumer/gmfood/applications</a>	Information/data requirements
Food Standards Australia New Zealand (n.d.)	Comparison of CFS1 to CFS2 Schedules	<a href="https://www.foodstandards.gov.au/code/proposals/Documents/Comparison%20of%20CFS1%20to%20CFS2%20Schedules.pdf">https://www.foodstandards.gov.au/code/proposals/Documents/Comparison%20of%20CFS1%20to%20CFS2%20Schedules.pdf</a>	Information/data requirements
Food Standards Australia New Zealand (n.d.)	P1025_CFS_Attach_A2_Schedules	<a href="https://www.foodstandards.gov.au/code/proposals/Documents/P1025_CFS_Attach_A2_Schedules.pdf">https://www.foodstandards.gov.au/code/proposals/Documents/P1025_CFS_Attach_A2_Schedules.pdf</a>	Information/data requirements
Health Canada (2020)	Decision Documents – Determination of Environmental and Livestock Feed Safety - Canadian Food Inspection Agency	<a href="https://inspection.canada.ca/plant-varieties/plants-with-novel-traits/approved-under-review/decision-documents/eng/1303704378026/1303704484236">https://inspection.canada.ca/plant-varieties/plants-with-novel-traits/approved-under-review/decision-documents/eng/1303704378026/1303704484236</a>	Information/data requirements
Health Canada (2021)	Completed safety assessments of novel foods including genetically modified (GM) foods	<a href="https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html">https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods/approved-products.html</a>	Information/data requirements
Health Canada (2021)	Plants with novel traits (PNT) and novel feeds from plant sources approved in Canada - Canadian Food Inspection Agency	<a href="https://inspection.canada.ca/active/netapp/plantnoveltraitpnt-vegearnouvcn/pntvcne.aspx">https://inspection.canada.ca/active/netapp/plantnoveltraitpnt-vegearnouvcn/pntvcne.aspx</a>	Information/data requirements
Ministry of Agriculture, Forestry and Fisheries (MAFF n.d.)	[Movements surrounding China's grain imports-Part 1] Feed demand in China is ...	<a href="http://www.maff.go.jp/j/zyukyu/jki/j_rep/monthly/201405/pdf/21_motnthly_topics_china_im_1405.pdf">http://www.maff.go.jp/j/zyukyu/jki/j_rep/monthly/201405/pdf/21_motnthly_topics_china_im_1405.pdf</a>	Information/data requirements
Ministry of Agriculture, Forestry and Fisheries (MAFF n.d.)	Document 5-2	<a href="http://www.maff.go.jp/j/council/sizai/siryo/22_21/pdf/data5-2.pdf">http://www.maff.go.jp/j/council/sizai/siryo/22_21/pdf/data5-2.pdf</a>	Scope of GMO application

National Technical Commission on Biosafety (CTNBio 2021)	Tabela de Plantas Aprovadas para Comercialização	<a href="http://ctnbio.mctic.gov.br/documents/566529/1684467/Tabela+de+Plantas+Aprovadas+para+Comercializa%C3%A7%C3%A3o/">http://ctnbio.mctic.gov.br/documents/566529/1684467/Tabela+de+Plantas+Aprovadas+para+Comercializa%C3%A7%C3%A3o/</a>	Information/data requirements
US Department of Agriculture (USDA 2020)	USDA APHIS   USDA Announces Deregulation of Enhanced Yield ...	<a href="https://www.aphis.usda.gov/aphis/newsroom/stakeholder-info/sa_by_date/sa-2020/sa-12/dereg-herb-com">https://www.aphis.usda.gov/aphis/newsroom/stakeholder-info/sa_by_date/sa-2020/sa-12/dereg-herb-com</a>	Information/data requirements
US Department of Agriculture (USDA 2021)	USDA APHIS   Petitions for Determination of Nonregulated ...	<a href="https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/permits-notifications-petitions/petitions/petition-status">https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/permits-notifications-petitions/petitions/petition-status</a>	Information/data requirements
US Department of Agriculture (USDA n.d.)	USDA APHIS   Home Landing Page	<a href="https://www.aphis.usda.gov/brs/data/brs-processed-move.json">https://www.aphis.usda.gov/brs/data/brs-processed-move.json</a>	Information/data requirements
US Department of Agriculture (USDA n.d.)	USDA APHIS   Home Landing Page	<a href="https://www.aphis.usda.gov/brs/data/moa-data.xlsx">https://www.aphis.usda.gov/brs/data/moa-data.xlsx</a>	Information/data requirements

**Table 15**      **Report of the Reliability and Implications for the Risk Assessment of all Relevant Publications Retrieved after Detailed Assessment of Full-text Internet Documents**

List of references for all relevant publications, classified by category of information/data requirements			
Category of information/data requirement(s)	Study (Author(s) and year)	Summary of reliability appraisal	Implications for the risk assessment
Allergenicity assessment of the newly expressed protein and the GM food/feed, and adjuvanticity	Food Standards Australia New Zealand (FSANZ 2020)	Not assignable because this document is an assessment and not an original study	This document is a risk assessment based on the data package provided by the applicant. Risk assessment describes sequence homology bioinformatics searches against known allergens confirmed past results for the PMI sequence. Therefore, the information does not change the conclusion of the risk assessment for MIR162 maize.

## 5.0 REFERENCES

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- EFSA. 2010. Scientific Opinion on the environmental risk assessment of genetically modified plants. *The EFSA Journal* (8) 11 (1879):1-111.
- 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. 62 pp. doi:10.2903/sp.efsa.2019.EN-1614.
- Herman RA, Zhenglin H, Mirsky H, Nelson ME, Mathesius CA and Roper JM. 2021. History of safe exposure and bioinformatic assessment of phosphomannose-isomerase (PMI) for allergenic risk. *Transgenic Res.* 30: 201-206.


## **APPENDIX SECTION**

## **APPENDIX A Search History and Subject Indexing**


7/9/2021

Ovid: Search Form

Agricola



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What's New

▼ Search History (99)

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<input type="checkbox"/>	# ▲	Searches	Results	Type	Actions	Annotations
<input type="checkbox"/>	1	MIR162.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	29	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	 <a href="#">Contract</a>
<input type="checkbox"/>	2	MIR 162.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	3	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	3	SYN-IR162-4.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	4	1 or 2 or 3	32	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	5	(Agrisure* adj2 Viptera*).mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	16	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	6	Vip3AA20*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	17	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	7	Vip3 AA20*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	8	Vip3 AA 20*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	9	Vip3A A 20*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	10	6 or 7 or 8 or 9	17	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	11	Phosphomannoisomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	3	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	12	Mannose 6-phosphate isomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	42	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	13	Phosphomannoseisomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	14	Phosphomannose isomerase.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	114	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	15	9023-88-5.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	16	AAA24109.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	17	"EC 5.3.1.8".mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	4	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	19	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18	150	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	20	10 or 19	167	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	21	Insect.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	189989	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	22	Insects.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	241742	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	23	lepidoptera*.mp. [mp=meeting information, title, original	38851	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

7/9/2021

Ovid: Search Form

		title, map information, note, abstract, heading words]					
<input type="checkbox"/>	24	pest.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	73680	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	25	pests.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	343147	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	26	noctuidae.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	7867	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	27	earworm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1068	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	28	ear worm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	41	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	29	armyworm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	3219	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	30	army worm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	153	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	31	cutworm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1413	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	32	cut worm*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	34	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	33	Helicoverpa.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	5143	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	34	H zea.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	492	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	35	Spodoptera.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	8598	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	36	S frugiperda.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	550	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	37	S exigua.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	573	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	38	Striacosta.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	35	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	39	S albicosta.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	16	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	40	Agrotis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1072	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	41	A ipsilon.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	92	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	42	Feltia.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	43	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	43	F jaculifera.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a>	<a href="#">More</a>	
<input type="checkbox"/>	44	Pseudaletia.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	454	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	45	P unipuncta.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	23	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	46	CEW.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	82	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
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<input type="checkbox"/>	48	WBC.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1664	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	49	21 or 22 or 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 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48	471684	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	50	toleran*.mp. [mp=meeting information, title, original title,	118733	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	

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2/7

7/9/2021

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		map information, note, abstract, heading words]				
<input type="checkbox"/>	51	resistan*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	297995	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	53	control*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	996464	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	54	50 or 51 or 52 or 53	1495326	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	55	((Insect or Insects or lepidoptera* or pest or pests or noctuidae or earworm* or ear worm* or armyworm* or army worm* or cutworm* or cut worm* or Helicoverpa or H zea or Spodoptera or S frugiperda or S exigua or Striacosta or S albicosta or Agrotis or A ipsilon or Feltia or F jaculifera or Pseudaletia or P unipuncta or CEW or FAW or WBC) adj2 (toleran* or resistan* or protect* or control*)),mp.	119765	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	56	Bacillus thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	10817	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	57	B thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1712	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	58	55 or 56 or 57	127218	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	59	GMO*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1563	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	65	living.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	60524	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	66	biotech*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	47024	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	67	64 or 65 or 66	728772	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	68	modif*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	255021	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	69	transform*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	181673	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	70	manipulat*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	41486	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	71	improv*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	557913	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	72	engineer*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	147392	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	73	deriv*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	308361	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	74	68 or 69 or 70 or 71 or 72 or 73	1281876	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	75	((genetic* or living or biotech*) adj3 (modif* or transform* or manipulat* or improv* or engineer* or deriv*)),mp.	61871	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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3/7



7/9/2021

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<input type="checkbox"/>	76	59 or 60 or 61 or 62 or 63 or 75	108658	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	77	Maize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	69677	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	78	corn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	137687	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	79	Zea mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	52068	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	80	Z mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	373	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
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<input type="checkbox"/>	82	Bt.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	7040	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	83	Bacillus thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	10817	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	84	B thuringiensis.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1712	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	85	82 or 83 or 84	14440	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	86	maize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	69677	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	87	corn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	137687	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	88	mays.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	52252	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	89	86 or 87 or 88	178526	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	90	((Bt or Bacillus thuringiensis or B thuringiensis) adj5 (maize* or corn* or mays)).mp.	1281	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	91	Btmaize*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	1	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	92	Btcorn*.mp. [mp=meeting information, title, original title, map information, note, abstract, heading words]	0	Advanced	<a href="#">Save</a>	<a href="#">More</a>	
<input type="checkbox"/>	93	90 or 91 or 92	1282	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	94	76 or 81	280096	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	95	20 and 94	84	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	96	76 and 81	6956	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	97	58 and 96	1554	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	98	4 or 5 or 93 or 95 or 97	1945	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	
<input type="checkbox"/>	99	limit 98 to yr="2020 -Current"	66	Advanced	<a href="#">Display Results</a>	<a href="#">More</a>	

Save Remove Combine with: AND OR

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Basic Search | Find Citation | Search Tools | Search Fields | **Advanced Search** | Multi-Field Search

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AGRICOLA 1970 to June 2021

☒ Keyword ☐ Author ☐ Title ☐ Journal

Search

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4/7

7/9/2021

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(\* or \$ for truncation)

Limits  
(expand)

☐ Include Multimedia

☒ Map Term to Subject Heading

Options

PrintEmailExport+ My ProjectsKeep Selected

View By

Text (66 Results)

Multimedia (0 Results)

Search Information

You searched:

limit 98 to yr="2020 -Current"

Search terms used:

162

9023-88-5

a

ipsilon

aaa24109

agrisure\*

agrotis

army

worm\*

armyworm\*

b

thuringiensis

bacillus

biotech\*

bt

btcom\*

btmaize\*

osw

control\*

com\*

cut

cutworm\*

deriv\*

e.c.

5.3.1.8

ear

earworm\*

ec

engineer\*

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jaculifera

faw

fetila

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helioverpa

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insect

insects

lepidoptera\*

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Range

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1

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☐ 1. Prevalence of genetically modified soybean in animal feedingsuffs in Poland

Cite

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☐ 2. Sweet Corn Sentinel Monitoring for Lepidopteran Field-Evolved Resistance to Bt Toxins

Cite

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☐ 3. Extended investigation of field-evolved resistance of the corn earworm Helicoverpa zea (Lepidoptera: Noctuidae) to Bacillus thuringiensis Cry1A.105 and Cry2Ab2 proteins in the southeastern United States

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☐ 4. Assessment of damage caused by evolved fall armyworm on native and transgenic maize in South Africa

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☐ 5. Use of taxonomic and trait-based approaches to evaluate the effect of Bt maize expressing the Cry1le protein on non-target collembola: A case study in Northeast China

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1

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mannose  
6-phosphate  
isomerase  
mays  
mir  
mir162  
modif\*  
noctuidae  
p  
unipuncta  
pest  
pests  
phosphomannoisomerase  
phosphomannose  
phosphomannoseisomerase  
protect\*  
pseudolethia  
resistan\*  
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albicosta  
exigua  
frugiperda  
spodoptera  
striacosta  
syn-ir162-4  
toleran\*  
transform\*  
transgen\*  
vip3  
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vip3aa20\*  
viptera\*  
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Search Returned:

66 text results

Sort By:

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Customize Display

Filter By

Add to Search History

Selected Only ( 0 )

▼ Years

All Years

Current year

Past 3 years

Past 5 years

► Specific Year Range

► Subject

► Author

► Journal

► Publication Type

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▼ Search History (99)

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<input type="checkbox"/>	# ▲	Searches	Results	Type	Actions	Annotations
<input type="checkbox"/>	1	MIR162.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	104	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	<a href="#">Contract</a>
<input type="checkbox"/>	2	MIR 162.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	16	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	5	(Agrisure* adj2 Viptera*).mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	29	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	6	Vip3AA20*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	45	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	7	Vip3 AA20*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
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<input type="checkbox"/>	9	Vip3A A 20*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	10	6 or 7 or 8 or 9	45	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	11	Phosphomannoisomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	17	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	12	Mannose 6-phosphate isomerase.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	135	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	19	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18	650	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	20	10 or 19	695	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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7/9/2021

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<input type="checkbox"/>	21	Insect.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	189067	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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2/7

7/9/2021

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	words]					
<input type="checkbox"/>	46	CEW.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	154	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	52	protect*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	1164552	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	55	((Insect or Insects or lepidoptera* or pest or pests or noctuidae or earworm* or ear worm* or armyworm* or army worm* or cutworm* or cut worm* or Helicoverpa or H zea or Spodoptera or S frugiperda or S exigua or Striacosta or S albicosta or Agrotis or A ipsilon or Feltia or F jaculifera or Pseudaletia or P unipuncta or CEW or FAW or WBC) adj2 (toleran* or resistan* or protect* or control*)),mp.	438882	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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3/7

7/9/2021

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<input type="checkbox"/>	77	Maize*.mp. [mp=abstract, original language book title (non-english), book title (english), title, heading words]	112016	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	95	20 and 94	188	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	96	76 and 81	16908	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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4/7



7/9/2021

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<input type="checkbox"/>	1	MIR162.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	66	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	<a href="#">Contract</a>
<input type="checkbox"/>	2	MIR 162.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	3	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	4	1 or 2 or 3	69	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	5	(Agrisure* adj2 Viptera*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	22	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	6	Vip3AA20*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	35	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	7	Vip3 AA20*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	8	Vip3 AA 20*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	9	Vip3A A 20*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	10	6 or 7 or 8 or 9	35	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	11	Phosphomannoisomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	3	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	12	Mannose 6-phosphate isomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	124	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	13	Phosphomannoseisomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	1	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	14	Phosphomannose isomerase.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	152	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	15	9023-88-5.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	16	AAA24109.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	17	"EC 5.3.1.8".mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	7	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	18	"E.C. 5.3.1.8".mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	7	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	19	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18	232	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	20	10 or 19	266	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	21	Insect.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	387581	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	22	Insects.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	773080	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	23	lepidoptera*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	170459	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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7/9/2021

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<input type="checkbox"/>	24	pest.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	419510	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	26	noctuidae.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	48888	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	27	earworm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	885	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	28	ear worm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	18	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	29	armyworm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	9623	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	31	cutworm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	2150	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	32	cut worm*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	76	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	34	H zea.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	1393	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	35	Spodoptera.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	17378	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	39	S albicosta.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	17	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	43	F jaculifera.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	5	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	44	Pseudaletia.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	651	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	45	P unipuncta.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	38	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	47	FAW.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	389	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	49	21 or 22 or 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 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48	918486	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	50	toleran*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	242959	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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2/7

7/9/2021

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<input type="checkbox"/>	51	resistan*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	666081	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	52	protect*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	515307	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	53	control*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	1986807	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	54	50 or 51 or 52 or 53	2884816	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	55	((Insect or Insects or lepidoptera* or pest or pests or noctuidae or earworm* or ear worm* or armyworm* or army worm* or cutworm* or cut worm* or Helicoverpa or H zea or Spodoptera or S frugiperda or S exigua or Striacosta or S albicosta or Agrotis or A ipsilon or Feltia or F jaculifera or Pseudaletia or P unipuncta or CEW or FAW or WBC) adj2 (toleran* or resistan* or protect* or control*)),mp.	188452	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	58	55 or 56 or 57	200676	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	59	GMO*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	71840	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	62	GE.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	7189	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	71	improv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	1046517	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	72	engineer*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	195782	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	73	deriv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	447233	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	74	68 or 69 or 70 or 71 or 72 or 73	2006400	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	77	Maize*.mp. [mp=abstract, title, original title, broad terms,	283183	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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3/7

7/9/2021

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<input type="checkbox"/>	78	corn*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	345536	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	79	Zea mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	228293	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	80	Z mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	1101	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	81	77 or 78 or 79 or 80	387469	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	86	maize*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	283183	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	88	mays.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	228351	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	92	Btcorn*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]	0	Advanced	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	93	90 or 91 or 92	2254	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	94	76 or 81	561669	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	95	20 and 94	145	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	96	76 and 81	13451	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	98	4 or 5 or 93 or 95 or 97	3597	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	99	limit 98 to yr="2020 -Current"	136	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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4/7

7/9/2021

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phosphomannoseisomerase  
protect\*  
pseudaletia  
resistan\*  
s  
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	organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]				
<input type="checkbox"/>	12 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]	384	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	13 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	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	14 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]	259	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	15 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	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	16 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	<a href="#">Save</a>   <a href="#">More</a>	
<input type="checkbox"/>	17 "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	<a href="#">Display Results</a>   <a href="#">More</a>	
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<input type="checkbox"/>	19 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18	496	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	20 10 or 19	518	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	21 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]	131085	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	22 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]	51946	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	23 lepidoptera*.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	19017	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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2/11

7/9/2021

Ovid: Search Form

		concept word, rare disease supplementary concept word, unique identifier, synonyms]				
<input type="checkbox"/>	24	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]	34475	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	25	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]	13648	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	26	noctuidae.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]	2442	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	27	earworm*.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]	311	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	28	ear 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]	7	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	29	armyworm*.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]	1498	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	30	army 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]	51	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	31	cutworm*.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]	372	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	32	cut 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]	9	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	33	Helicoverpa.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]	2504	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	
<input type="checkbox"/>	34	H zea.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-	337	Advanced	<a href="#">Display Results</a>   <a href="#">More</a>	

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3/11

7/9/2021

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		heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]				
<input type="checkbox"/>	35	Spodoptera.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]	11491	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	36	S frugiperda.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]	638	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	37	S exigua.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]	546	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	38	Striacosta.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]	31	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	39	S albicosta.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]	16	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	40	Agrotis.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]	305	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	41	A ipsilon.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]	83	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	42	Feltia.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]	11	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	43	F jaculifera.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	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	44	Pseudaletia.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]	155	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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4/11

7/9/2021

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<input type="checkbox"/>	45	P unipuncta.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]	14	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	46	CEW.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]	165	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	47	FAW.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]	185	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	48	WBC.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]	18397	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	49	21 or 22 or 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 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48	214647	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	50	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]	353108	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	51	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]	1195961	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	52	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]	917505	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	53	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]	5704609	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	54	50 or 51 or 52 or 53	7344089	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	55	((Insect or Insects or Lepidoptera* or pest or pests or noctuidae or earworm* or ear worm* or armyworm* or army worm* or cutworm* or cut worm* or Helioverpa or H zea or Spodoptera or S frugiperda or S exigua or Striacosta or S albicosta or Agrotis or A ipsilon or Feltia or F jaculifera or Pseudaletia or P unipuncta or CEW or FAW or WBC) adj2 (toleran* or resistan* or protect* or control*)).mp.	31390	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	56	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]	9108	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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5/11

7/9/2021

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	concept word, rare disease supplementary concept word, unique identifier, synonyms]				
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<input type="checkbox"/>	58 55 or 56 or 57	37468	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	59 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]	2162	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	60 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]	2538	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	61 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]	53557	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	62 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]	20217	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	63 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]	227830	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	64 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]	4176654	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	65 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]	427267	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	66 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]	71411	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	67 64 or 65 or 66	4604815	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	68 modifi*.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]	1202834	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	















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6/11



7/9/2021

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<input type="checkbox"/>	70	manipulat*.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]	210543	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	71	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]	2761173	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	72	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]	286205	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	73	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]	2043877	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	74	68 or 69 or 70 or 71 or 72 or 73	6291742	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	75	((genetic* or living or biotech*) adj3 (modif* or transform* or manipulat* or improv* or engineer* or deriv*)).mp.	164740	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	76	59 or 60 or 61 or 62 or 63 or 75	422647	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	77	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]	33513	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	78	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]	222152	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	79	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]	38517	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
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<input type="checkbox"/>	81	77 or 78 or 79 or 80	258804	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	82	Bt.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept	15981	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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7/11

7/9/2021

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	word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]				
<input type="checkbox"/>	83 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]	9108	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	84 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]	2344	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	85 82 or 83 or 84	22542	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	86 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]	33513	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	87 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]	222152	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	88 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]	38783	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	89 86 or 87 or 88	259027	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	90 ((Bt or Bacillus thuringiensis or B thuringiensis) adj5 (maize* or corn* or mays)).mp.	841	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	91 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	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	92 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	<a href="#">Save</a> <a href="#">More</a>	
<input type="checkbox"/>	93 90 or 91 or 92	841	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	94 76 or 81	673763	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	95 20 and 94	85	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	96 76 and 81	7688	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	97 58 and 96	1236	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	98 4 or 5 or 93 or 95 or 97	1535	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	
<input type="checkbox"/>	99 limit 98 to yr="2020 -Current"	148	Advanced	<a href="#">Display Results</a> <a href="#">More</a>	

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8/11


7/9/2021

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10/11

7/9/2021

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