IR-4 Provides Economic Viability

The specialty food crop value in Virginia is $599 million.

Specialty crops include most vegetables, fruits, nuts, herbs, nursery and flower crops.

The economic loss of these crops could be as much as $21.7 million.

IR-4’s research helped to register Section 18 Emergency Exemptions for Virginia, that helped prevent this loss from occurring. A registration is granted by the Environmental Protection Agency (EPA) for a particular pest control product on a specific crop. Many of these registrations have been turned to permanent registrations. In 2003, ninety-five of the 120 Section 18 Emergency Exemptions that were converted to final registrations were credited to IR-4 by the EPA.

IR-4 Provides Research in Support of a Safe and Secure Food Supply

The Reduced Risk chemicals that IR-4 researches and receives clearances, from the Environmental Protection Agency (EPA), are able to control pests that destroy crops, without harming the individuals that use them, the food that is harvested, or the environment in which the crops are grown.

IR-4 Helps Farmers Compete in a Global Economy

With farm production costs rising every day, IR-4 research helps growers stay ahead of global competition, by producing safe and effective pest management solutions for their high value specialty crops.
APPLE
2,4-D
Aluminum Phosphide
Codling Moth Granulosis Virus

APRICOT
2,4-D
Malathion
Pronamide

ASPARAGUS
2,4-D
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
Dimethoate
Fluazifop
Fosetyl Al
Glyphosate
Linuron
Malathion
Myclobutanil
Norflurazon
Paraquat
Pronamide
Sethoxydim
Terbacil

BLUEBERRY cont.
Tebufenozide
Terbacil
Ziram

BOK CHOY
Bacillus thuringiensis
Chlorpyrifos
Cyromazine
DCPA
Methomyl

BROCCOLI
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
Glyphosate
Malathion
Oxyfluorfen
Paraquat
Sodium Hypochlorite

BROCCOLI RAAB
Bacillus thuringiensis
Chlorpyrifos
Esfenvalerate
Glyphosate
Methomyl
Permethrin
Sodium Hypochlorite

CABBAGE
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
DCPA
Endothall
Glyphosate
Malathion
Methomyl
Oxyfluorfen
Paraquat
Sodium Hypochlorite

CANTALOUPE
Bacillus thuringiensis
Glyphosate
Imidacloprid
Malathion
Metalaxyl + Mancozeb
Paraquat
Permethrin

CARROT
Bacillus thuringiensis
Glyphosate
Iprodione
Malathion
Metribuzin
Paraquat
Sethoxydim
Thiabendazole

CAULIFLOWER
Bacillus thuringiensis
Chlorpyrifos
DCPA
Endothall
Glyphosate
Malathion
Methomyl
Oxyfluorfen
Paraquat
Sodium Hypochlorite

CHINESE CABBAGE (NAPA)
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
DCPA
Glufosinate
Malathion
Metalaxyl
Paraquat
Sodium Hypochlorite

CHINESE CABBAGE (NAPA) cont.
S-Metolachlor
Sodium Hypochlorite

CILANTRO
Bacillus thuringiensis
Chlorothalonil
Methyl Anthranilate
Norflurazon
Paraquat
Permethrin

CUCUMBER
Bacillus thuringiensis
Chlorpyrifos
Cyromazine
DCPA
Endothall
Fosetyl-Al
Glyphosate
Malathion
Paraquat
Permethrin

CUTLEAF
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
DCPA
Endothall
Fosetyl-Al
Glyphosate
Linuron
Malathion
Myclobutanil
Norflurazon
Paraquat
Permethrin

CYCLOPEDIA
Bacillus thuringiensis
Chlorpyrifos
Endothall
Metribuzin
Paraquat
Sodium Hypochlorite

DANDELION
Sodium Hypochlorite

EGGPLANT
Bacillus thuringiensis
Bifenthrin
Clopyralid
Hexakis
Paraquat
Permethrin

ENDIVE
Bacillus thuringiensis
Fluazifop
Imazethapyr
Sethoxydim

HONEY and BEESWAX
Bacillus thuringiensis
Formic Acid
Methanol

LETTUCE
Bacillus thuringiensis
Chlorpyrifos
Clopyralid
DCPA
Endothall
Fosetyl-Al
Glyphosate
Imidacloprid
Maleic Hydrazide
Metalaxyl
Myclobutanil
Norflurazon
Paraquat
Sethoxydim

LIMA BEAN
Bacillus thuringiensis
Sodium Chlorate
Sodium Hypochlorite

Clearances On Some Important Virginia Crops
continued on back
<table>
<thead>
<tr>
<th>Plant</th>
<th>Insecticide/Herbicide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mustard Greens</td>
<td>Bacillus thuringiensis, Glyphosate, Iprodione, Malathion, Methomyl, PCNB, Sodium Hypochlorite</td>
</tr>
<tr>
<td>Nectarine</td>
<td>2,4-D, Clopyralid, Fludioxonil, Iprodione, Pronamide</td>
</tr>
<tr>
<td>Okra</td>
<td>Bacillus thuringiensis, Carbaryl, Esfenvalerate, Glyphosate, Methomyl, Paraquat</td>
</tr>
<tr>
<td>Onion (Green)</td>
<td>Bromoxynil, Cypermethrin, Dimethomorph, Glyphosate, Methomyl, Paraquat</td>
</tr>
<tr>
<td>Parsley</td>
<td>Azinphos-methyl, Bacillus thuringiensis, Linuron, Prometryn, Sethoxydim</td>
</tr>
<tr>
<td>PEA (Succulent)</td>
<td>Bacillus thuringiensis, Clomazone</td>
</tr>
<tr>
<td>Peach</td>
<td>2,4-D, Chlorpyrifos, Clopyralid, Fludioxonil</td>
</tr>
<tr>
<td>Potato</td>
<td>Bacillus thuringiensis, Calcium Hypochlorite, Clethodim, Clopyralid, Glyphosate, Malathion, S-Metolachlor, Phosmet, Prometryn</td>
</tr>
<tr>
<td>Squash (Winter/Summer)</td>
<td>Bacillus thuringiensis, Clomazone, Dimethomorph, Glyphosate, Imidacloprid, Metalaxyl + Mancozeb, Paraquat, Permethrin</td>
</tr>
<tr>
<td>Strawberry</td>
<td>2,4-D, Acifluorfen, Captan, Chlorpyrifos, Glyphosate, Methyl Anthranilate, Methyl Anthranilate Propargite</td>
</tr>
<tr>
<td>Raddish</td>
<td>Bacillus thuringiensis, DCPA, Methomyl, Spinosad, Sodium Hypochlorite</td>
</tr>
<tr>
<td>Radish</td>
<td>Bacillus thuringiensis, Clomazone, Glyphosate, Imidacloprid, Paraquat, Permethrin</td>
</tr>
<tr>
<td>Pepper (Bell)</td>
<td>Bacillus thuringiensis, Clomazone, Glyphosate, Imidacloprid, Paraquat, Permethrin, S-Metolachlor</td>
</tr>
<tr>
<td>Pepper (Non-Bell)</td>
<td>Bacillus thuringiensis, Bifenthrin, Clomazone, Glyphosate, Hexais, Malathion, Norflurazon, Oxyfluorfen, Sethoxydim, Sulfur</td>
</tr>
<tr>
<td>Plum</td>
<td>2,4-D, Clopyralid, Fludioxonil, Iprodione, Pronamide</td>
</tr>
<tr>
<td>Snap Bean</td>
<td>Clomazone, Lactofen, Myclobutanil</td>
</tr>
<tr>
<td>Spinach</td>
<td>Azoxyostrobin, Bacillus thuringiensis, Clethodim, Clopyralid, Glyphosate, Malathion, S-Metolachlor, Phenmedipham, Sethoxydim</td>
</tr>
<tr>
<td>Tomato</td>
<td>Bacillus thuringiensis, Glyphosate, Imidacloprid, Paraquat</td>
</tr>
<tr>
<td>Turnip (Root/Greens)</td>
<td>Bacillus thuringiensis, Chlorpyrifos, Clopyralid, Esfenvalerate, Fosetyl-Al, Malathion, Methomyl, Paraquat, Permethrin, Spinosad</td>
</tr>
<tr>
<td>Nectarine</td>
<td>2,4-D, Chlorpyrifos, Clopyralid, Fludioxonil, Iprodione, Pronamide</td>
</tr>
<tr>
<td>Peach</td>
<td>2,4-D, Chlorpyrifos, Clopyralid, Fludioxonil</td>
</tr>
<tr>
<td>Potato</td>
<td>Bacillus thuringiensis, Calcium Hypochlorite, Clethodim, Clopyralid, Glyphosate, Malathion, S-Metolachlor, Phosmet, Prometryn, Sethoxydim</td>
</tr>
<tr>
<td>Squash</td>
<td>Bacillus thuringiensis, Clomazone, Dimethomorph, Glyphosate, Imidacloprid, Metalaxyl + Mancozeb, Paraquat, Permethrin</td>
</tr>
<tr>
<td>Strawberry</td>
<td>2,4-D, Acifluorfen, Captan, Chlorpyrifos, Glyphosate, Methyl Anthranilate, Methyl Anthranilate Propargite</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>2,4-D, Bacillus thuringiensis, Methyl Anthranilate, Propargite</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>Bacillus thuringiensis, Calcium Hypochlorite, Carbaryl, Clomazone, Fluazifop, Napropamide, Phosmet, Pyrethrin + Piperonyl Butoxide, Sethoxydim, Thiabendazole</td>
</tr>
<tr>
<td>Watermelon</td>
<td>Bacillus thuringiensis, Bifenthrin, Glyphosate, Imidacloprid, Methyl Anthranilate, Methyl Anthranilate Propargite</td>
</tr>
</tbody>
</table>

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IR-4: A Success Story Worth Telling

Since 1963, the IR-4 Project has cooperated with researchers, producers, the agri-chemical industry and federal agencies to secure regulatory clearances for pest management products on specialty crops.

Since 2000, over 80% of IR-4’s research effort has involved new pest management technology with biopesticides and Reduced Risk chemistries. This huge shift was a direct result of the focus IR-4 placed on advocating this new technology. It was accomplished through a three pronged approach consisting of partnering with the agricultural chemical companies, educating specialty crop stakeholders, and partnering with the EPA to facilitate specialty crop registrations.

IR-4 recognized that without access to the new technology it could not assist specialty crop growers. So they solicited industry’s willingness to work together on new product development strategies which, for the first time, included specialty crops in their development plans. The foundation for this close working relationship was crop grouping, where studies on a few key crops would allow for registration on many more crops; many of those were specialty crops.

The other aspect of IR-4’s emphasis on new technology was the educational facet. It became clear that with reduced staffs in many of the companies due to mergers, federal and state research/extension scientists were not always given the ability to test the new materials. IR-4 instituted a mechanism through publication of New Pest Control Products/Transition Solutions List to inform the public about the virtues of the new technology to assist in the transition away from Food Quality Protection Act (FQPA) vulnerable crop protection tools.

Today, IR-4 continues to work as a model government funded program due to unique partnerships formed between the USDA (CSREES and ARS), the IR-4 Headquarters and Regional staff, the land grant university system, the crop protection industry, commodity and grower groups and the EPA.

Virginia Agriculture is Heavily Dependent on Specialty Crops
IR-4 thanks the entire Congressional delegation from Virginia for their support.

Estimated Potential Loss Without Use of the IR-4 Based Section 18s for Virginia (from 1998-2002)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Economic Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape</td>
<td>$ 400,000</td>
</tr>
<tr>
<td>Pepper</td>
<td>$ 900,000</td>
</tr>
<tr>
<td>Spinach</td>
<td>$ 600,000</td>
</tr>
<tr>
<td>Tomato</td>
<td>$ 400,000</td>
</tr>
<tr>
<td>Watermelon</td>
<td>$19,400,000</td>
</tr>
<tr>
<td>Total</td>
<td>$21,700,000</td>
</tr>
</tbody>
</table>

1997 Census of Agriculture
From 1998 to 2002