Risk Management Decision Document

FOR POLICY REGARDING: *Duponchelia fovealis Zeller* in Canada

TRIGGER FOR REVIEW AND BACKGROUND:

In early March 2005, a sample of an insect was submitted to Agriculture and Agri-food Canada from an Ontario greenhouse and was subsequently identified as *Duponchelia fovealis*. Early April, 2005 the Plant Quarantine Pest Laboratory, Canadian Food Inspection Agency (CFIA), confirmed this identification. This was the first report of *D. fovealis* in Canada. This insect is regularly intercepted in import shipments by the United States in or on fruits (e.g., peppers), fresh vegetables, herbs and cut flowers. Although this pest is not listed on the United States Department of Agriculture=s (USDA) regulated pest list, shipments found with this insect have been subject to regulatory action. The USDA has indicated to Canada that they consider this insect as a quarantine pest. The USDA is currently evaluating its quarantine significance. Despite its relatively recent spread throughout Europe, only Iceland considers this pest as a quarantine pest. Relatively conservative countries, such as the United Kingdom, do not consider this pest as a quarantine pest.

Subsequently, the CFIA was informed that this pest may be present in two greenhouses in Ontario. CFIA visited both greenhouses and confirmed the presence of this insect. Both facilities were placed under quarantine until a decision as to the quarantine status of the pest could be made by the CFIA. A Pest Risk Assessment (PRA) was initiated to determine the plant health risk of *D. fovealis.* The PRA was completed on May 6, 2005 (PRA 2005-07) and has undergone one revision.

The PRA assessed risks associated with both the outdoors (natural) and indoor (e.g. greenhouse) environments. The PRA concluded that potential introduction impacts are low for the outdoor environment but medium for indoor environments for this pest. The potential introduction impact is determined by assessing the combination of:

- establishment potential (negligible for the outdoor environment, high for indoor environments);
- natural spread potential (low for both outdoor and indoor environments);
- potential economic impact (high for both categories); and
- potential environmental impact (negligible for both categories).

The overall risk, which is a combination of likelihood of introduction (high) and potential introduction impacts (low for outdoor environments and medium for indoor environments), was also determined to be low (outdoor environments) or medium (indoor environments). A rating of medium indicates that phytosanitary measures may be necessary.

The amount of uncertainty in this PRA was rated as high due to reliance on secondary (internet) literature, and much information was available only in Dutch or Italian, or anecdotally.

RISK MANAGEMENT CONSIDERATIONS:

Trade

The United States is Canada=s biggest trading partner for crops affected by *D. fovealis*. The USDA has taken regulatory action on this pest more than 90 times since 1996 on a variety of imported commodities including fruit, leaves, cut flowers and propagative materials from a number of sources. The majority of the interceptions occurred on *Capsicum* sp., in or on fruits. Hence, this pest has the potential to impact the trade of several different commodities including aquatic plants, potted plants, cut flowers and fresh vegetable products.

Distribution

D. fovealis originates in the Mediterranean region and the Canary Islands. It has since been found in other parts of Africa, Asia Minor, and southern Europe. In Malta, it has been reported as common in gardens and orchards. There are no reports from the Western Hemisphere, apart from import interceptions by the USDA.

The first report outside its native range is attributed to Finland in 1984. In the Netherlands, the first record was in glasshouses in 1989. In 2003, the pest was new for Overijssel, Noord-Holland and Noord-Brabant, becoming more frequent outdoors. In summer, moths have been seen outside greenhouses on outdoor plantings. This pest has also been reported in greenhouses in Italy. In northern Italy, this pest has been reported to overwinter outdoors and has been observed reproducing on a number of wild plants.

In the United Kingdom, the first reports of this insect were in 2001, when numerous records occurred in the south of England from early August to late October. Two specimens, one late in December and the other in early January 2002, were associated with a foreign-potted orchid indoors. One adult collected at light in June 2001 at Ponts Mill, Cornwall, was within 10 km of a known glasshouse infestation two years earlier. (PRA 2005-07)

Relevant Statistics

In 2004, the value of potted plants (including mushroom spawn) exports from Canada to the United States was $254 million (US) (Strategis Canada, Accessed April 27, 2005).

In 2004, the value of cut flowers exports from Canada to the United States was $22 million (US) (Strategis Canada, Accessed April 27, 2005).

In 2004, the value of pepper (fresh and chilled, greenhouse and field grown) exports from Canada to the United States was $106 million (US) (Strategis Canada, Accessed April 27, 2005).

In 2004, the value of tomato (fresh and chilled, greenhouse and field grown) exports from Canada to the United States was $271 million (US) (Strategis Canada, Accessed April 27, 2005).

Biology

D. fovealis has an egg, larva, pupa, and adult stages.

Eggs are laid singly or in masses of 5-10, overlapping in tile-like fashion, either on the undersides of leaves close to the veins, low down on the stalks or at the base of the host plant, or in the upper soil layer. Under greenhouse conditions, hatching occurs about eight days after oviposition.

The larvae feed on leaves and flowers and bore into stems. They also may feed on buds and decaying plant debris. The larvae live among spun leaves. They move rapidly and prefer humid sites lower down in the crop, on the ground, in the upper soil layer, or on exposed roots of plants. Under greenhouse conditions, larvae reach maturity about four weeks after hatching. At maturity, the larva makes a cocoon, which in captivity occurs low on the sides of the rearing receptacle.

The cocoon itself is made of silk mixed with frass, or particles of soil. Pupation occurs in the cocoon. Under greenhouse conditions, the pupa lasts 1-2 weeks. Adult lifespan is about 1-2 weeks. The adult female lays about 200 eggs during her lifetime.

There are no reports of cold tolerance or any type of diapause in any life stage. However, in the summer months, this insect could possibly have one life cycle in the outdoor Canadian environment, hence could affect outdoor grown crops in areas surrounding infested greenhouses. (PRA, 05-07).

Hosts

Hosts include a wide range of ornamental plants and field crops. Known hosts to date include: *Amaranthus, Aneome, Annona, Anthurium, Apium, Aponogeton, Bacopa, Begonia, Bellis, Capsicum, Chenopodium, Cineraria, Codiaeum, Coleus, Convolvulus, Cryptocoryne, Cucumis, Cuphea, Cyclamen, Echinodorus, Eustoma, Euphorbia, Ficus, Gerbera, Heuchera, Impatiens, Kalanchoe, Lactuca, Limonium, Lisianthus, Ludwigia, Lycopersicon, Lysimachia, Malva, Mentha, Ophiopogon, Origanum, Oxalis, Plantago, Punica, Ranunculus, Rosa, Rubus, Rumex, Sambucus, Sarracenia, Senecio, Tanacetum, Thymus, Zea*.

Means of Dispersal

D. fovealis has been described as a good flier. In the Netherlands, moths have been

found in light traps about 100km from greenhouses where the moth is known to occur.

Dispersal can also occur through the movement of propagative and non-propagative material including fruit, herbs and fresh vegetable products and cut flowers.

Generation Time and Eradication of *D. fovealis*

Under greenhouse conditions, the generation time of *D. fovealis* is six to eight weeks. In order to assess the efficacy of treatments and to declare that an infested facility has eradicated this pest, a greenhouse must be monitored for 10 weeks. As a result, it will take a minimum of 10 weeks for an infested facility to be declared free from this pest. This time frame is assuming that the pest control products applied by the facility are effective.

Impacts

D. fovealis larvae can damage or contaminate stems, leaves, and fruits of greenhouse flowers and vegetable crops. Moreover, damage to flower/vegetable crops could affect fresh-market sales. Injury to leaf and fruit surfaces may lead to down-grading of the quality class of the produce. Growing susceptible crops near greenhouses could result in locally dense populations.

This pest may also affect existing production practices. IPM and biocontrol programs may be interrupted by the necessity of applying pesticides to control this insect, leading to extra cost and chemical use.

Experience in Canada would indicate that the impact of the insect in the greenhouse environment may be mitigated by routine pest management practises. This is evidenced by the fact that the insect remained at low levels a number of months following introduction into a facility employing only biocontrol measures.

One of the biggest implications of this pest could be its effects on trade. The USDA does take action on this pest when it is found in import shipments.

Risk Mitigation Methods

Treatments: Chemical Control

Broad-spectrum insecticides can be used against *D. fovealis*; however, control may be difficult to achieve because boring larvae inside plant stems and fruits may be protected against the effects of contact insecticides.

Spinosad (Conserve®), and teflubenzuron (Nemolt®) have been studied under greenhouse conditions in the Netherlands. These chemicals performed better than the untreated control but were less effective than ‘Bt’ and soil-dwelling biocontrol agents.

Their efficacy was influenced by the type of crop on which they were applied: on *Cyclamen*, the spray flowed from the leaf to the crown of the plant (funnel effect), so one overhead application per week was sufficient; on *Kalanchoe*, the spray flowed away from the plant (umbrella effect), so spray should be directed at places where the larvae are more likely to be in order to obtain the best effect. The latter method was more labour intensive, but treatments only had to be applied once every two weeks (PRA, 05-07).

A smoke fumigant is registered for premises in Canada and a minor use has been approved specifically for this pest. Problems might include coverage, persistence, non-target effects on biological control agents being used on other crops within greenhouse premises, and cosmetic or more serious effects on cut flowers (PRA, 05-07).

Treatments: Biological Control

Bacillus thuringiensis ['Bt'] has been tested against *D. fovealis* under greenhouse conditions in the Netherlands. 'Bt' worked best of all products or biocontrol agents tested; the strain in these trials was Turex®. A 'Bt' product, Dipel, has been approved for use as a larvicide on Canadian greenhouse crops that may be infested with this pest.

Soil-dwelling biocontrol agents have been tested against *D. fovealis* under greenhouse conditions in the Netherlands, e.g., *Atheta coriaria*, *Heterorhabditus bacteriophora*, *Hypoaspis aculeifer* and *H. miles*, and *Steinernema feltiae*. Of these, the mite, *Hypoaspis miles*, showed the most promise, but the level of control was influenced by the growth medium. The beetle, *Atheta coriaria*, was effective against eggs and first-instar larvae, but not against older larvae; it, too, was affected by the growth medium (PRA, 05-07).

Cultural Practices

Insecticides applied during the season against other pests, e.g., leafminers and whiteflies in greenhouses, will prevent the increase of this moth. Light trapping, a useful monitoring tool, also may be used to reduce adult populations within greenhouses.

Based on greenhouse studies in the Netherlands, best practices may include the following :

- screen all openings, close doorways between ranges
- sanitation, i.e., remove plant refuse from all production areas
- non-infested plant material may be used as a trap around plants that show tolerance to *D. fovealis*

- use of drier growth medium in critical periods, i.e., peat-perlite instead of peat alone.

Monitoring Techniques
Regular visual inspections, and light traps can be used to monitor adult moth activity. Blue (ultraviolet) light is particularly effective for monitoring for adults in greenhouses. Individual adults may survive about 2-3 weeks; overlapping generations may occur in greenhouse infestations.

A commercially produced pheromone is not available; however, the behaviour of the insect (i.e. vertical position of the abdomen of the resting adult) suggests the presence of a pheromone. Future research could focus on isolating this pheromone for commercial reproduction.

PEST RISK MANAGEMENT OPTIONS:

A) Do not regulate *D. fovealis*

Facilities with this pest would not be subject to quarantine action or regulatory control. Imported material found to be infested with this pest will not be subject to regulatory control. As a result, there would be no phytosanitary restrictions for infested shipments of material being imported into Canada or for movement within Canada. *D. fovealis* could spread to other greenhouses (including vegetable production ranges and ornamental production ranges) by the movement of plant material or through flight in the summer months. Damage in greenhouses could result in a down grade of quality. Though the insect does not overwinter in Canada, in the summer months, there could be migration from the protected indoor environment. This could impact on field crops such as corn, field tomatoes, peppers and *Cucumis sp.*

Growers would have to manage this pest. Currently there are two (2) emergency registrations for pesticides for greenhouse use. However, growers are reluctant to use one of the pesticides because its effect on the crop. There are no pesticides fully registered for this pest, therefore, applications for pesticide registrations would have to be made for each affected commodity. Cultural practices, such as sanitation, reducing humidity, sourcing non-infested material, roguing and the use of light traps may mitigate damage. For those growers who currently use IPM and biocontrol, this pest may result in the grower choosing to add chemicals to their pest control program, if damage levels warranted their use, to control this pest until a suitable biocontrol agent could be registered for use in Canada. However, some damage was observed in the one cut flower greenhouse in Ontario where the pest is believed to have occurred for almost a year. Regular greenhouse management practises may have non-target effects on this insect and, as a result, keep population levels below an economic threshold. In other countries into which the insect has been introduced (for example Finland and The Netherlands) growers have been able to keep insect levels below an economic threshold using integrated control strategies.

Export markets, in particular, the United States market, would be affected. The USDA has taken action on this pest when it was found in imported materials in the past. There could be trade implications for cut flowers, potted plants (could include plants certified under the Canadian Greenhouse Certification Program), peppers and other host crops. There are management practises that could be implemented that would mitigate the risk of the pest being associated with the final product. For example, blossom inspection and the removal of a significant portion of the lower stem of a cut flower may be adequate to ensure pest freedom.

B) Regulate *D. fovealis*

Regulating the pest could consist of two different options:

1) Eradicate this pest from greenhouses and declare Canada as free from *D. fovealis.*

2) Manage this pest in currently infested areas and declare the rest of Canada as free from *D. fovealis.*

Option 1: Eradicate the pest

Greenhouses or locations found infested with *D. fovealis* will be subject to regulatory control. Infested locations will be subject to quarantine actions until appropriate measures are taken in order that the facility can be declared free from this pest. The CFIA would develop a long term eradication protocol which could include pesticide applications, destruction of host material and other risk mitigating factors. In order to declare this pest eradicated from the facility, a minimum of 10 weeks of post treatment monitoring will be required. The CFIA would also require extra resources to implement this eradication protocol. Under the Plant Protection Act, growers, consultants, provincial authorities and any other person who suspects *D. fovealis* would have to report finds to the CFIA.

Traceback and traceforward follow-ups would be conducted. Possible sources of infection will be examined and regulated accordingly.

The CFIA would develop a pest specific import policy for host of *D. fovealis* (including cut flowers, fruit, propagative materials, and leaf materials) and could require pest risk mitigation measures and phytosanitary certification for these materials from infested countries. Shipments imported into Canada found infested with this pest will also be subject to regulatory action.

The CFIA would also develop a survey protocol. This survey protocol will likely be multi-year. The purpose of the survey would be to verify that Canada is free from *D. fovealis*.

Spread of *D. fovealis* would be minimized as eradication will remove current infestations and an import policy will address the risk of new infestations from entering into Canada.

CFIA may charge for services, including inspections, related to the above activities. These fees would result in additional costs and impacts on the industry.

The impact on export markets would be minimized.

Option 2: Manage this pest in areas currently considered infested areas and declare the rest of Canada as free from this pest

Areas infested with this pest will be determined by a survey. In infested areas, growers will be responsible for managing this pest. There will likely be restrictions of movement within Canada for materials originating from infested areas and that are destined to areas free from this pest. Areas declared as infested will likely be subject to additional phytosanitary requirements.

Under the Plant Protection Act, growers, consultants, provincial authorities and any other person who suspects *D. fovealis* in areas declared to be free from this pest would have to report finds to the CFIA. CFIA will verify the presence of this pest. If the pest is found, these areas will be declared infested and will be subject to restrictions and regulations accordingly.

The CFIA will develop an import & domestic policy for host of *D. fovealis* (including cut flowers, fruit, propagative materials, and leaf materials). Canada would require pest risk mitigation measures and phytosanitary certification for materials from infested countries destined to non-infested areas in Canada. Imported shipments destined to non-infested areas of Canada found to be infested with this pest will be subject to regulatory action. Domestic shipments of regulated commodities from infested areas would require the issuance of CFIA movement certificates.

CFIA may charge for services, including inspections, related to the above activities. These fees would result in additional costs and impacts on the industry.

The CFIA would also develop a survey protocol. This survey protocol will likely be multi-year. The purpose of the survey would be to verify areas of freedom within Canada for this pest.

Spread of *D. fovealis* in Canada could still occur, however, would be minimized (when compared to deregulation of this pest). Movement and import restrictions would help to prevent the introduction of this pest into areas free from *D. fovealis*. However, *D. fovealis* could spread by flight during the summer months.

For areas of Canada declared free of *D. fovealis*, the impact on export markets would be minimized. Trade would be likely be affected for areas declared infested with this pest.

Eradication and control of this pest would result in significant resource constraints for the CFIA, potentially impacting on the delivery of other programs.

CONSULTATIONS:
1) Initial consultations
CFIA *D. fovealis* Team
Horticulture Team, CFIA

2) External Consultations
CHC
CPMA
Flowers Canada
Canadian Nursery Landscape Association
Provincial Governments

RISK MANAGEMENT DECISION:
Based on the risk identified by the PRA, the CFIA will not be regulating this pest for Canada (Option A, above). Risk mitigation measures, including generally accepted production practises, will keep this pest below significant economic damage thresholds.

REFERENCES:

Plant Health Risk Assessment Unit. Canadian Food Inspection Agency. May 6, 2005. Pest Risk Assessment: *Duponchelia fovealis*. PHPD Request: 2005-07.

Strategis Canada, 2005. http://strategis.gc.ca/sc_mrkti/tdst/tdo/tdo.php?lang=30&headFootDir=/sc_mrkti/tdst/headfoot&productType=HS6&cacheTime=962115865#tag Accessed April 27, 2005.