

# Garlic Insect Pests

This factsheet provides information on garlic insect pests in Southern Interior B.C. based on surveys conducted from 2013-2015 and garlic samples submitted to the Ministry of Agriculture for insect identifications. Survey results indicate that insect pests are not a major issue in garlic production and recorded pests were minor. No onion maggots were detected in the 3-year survey. However, onion maggot flies were reared from a garlic sample submitted to the BC Ministry of Agriculture, Kelowna.

## Onion Maggot (*Delia antiqua*)

### Identification

**Adult** - small grey bristly fly, 6 mm long, slightly smaller than a housefly.

**Egg** - white and elongated, 1-1.5 mm.

**Larva** - white legless maggots, pair of black mouth hooks at tapered end, up to 8 mm long.

**Pupa** - oval, dark brown, 6 mm long, resembles wheat grain.



Left to right, Onion maggot adult, eggs and larva.

### Life Cycle

There are three generations per year. Adult flies emerge from late April to early May and females lay eggs in the soil near the plant. Eggs hatch within a week; maggots feed in the developing bulb and basal plate and mature within 2 - 3 weeks. Mature maggots pupate in the soil and flies emerge in about two weeks. Third generation pupae overwinter in the soil and emerge in the spring.

### Hosts

Garlic, onion, shallots and leeks; prefers onions.

### Damage

The maggots feed on seedlings, transplants and bulbs. Infested plants wilt and turn pale green to yellow. First generation maggots in the spring cause the most damage. Young plants are more susceptible to attack and can be killed, established plants are damaged but not usually killed. Feeding damage causes misshapen bulbs and allows the entry other species of maggots and decay organisms.



*Infested plant showing yellowing and drooping leaves*



*Rotting plant with maggot.*

## **Monitoring**

Use white sticky traps (1 trap/acre) to monitor first generation flies from mid-April to early May. A threshold of 1 fly/10 traps/day is recommended. Change traps weekly.



*White sticky trap for monitoring adult flies.  
Photo courtesy of Tamara Richardson,  
Cornucopia Crop Consulting, Cawston.*

## **Control**

**Biological control** - Parasitic wasps, predatory flies, ground beetles and pathogenic fungi help reduce onion maggot populations.

**Cultural control** - Harvest all bulbs, remove culls, volunteer crops and crop residues from the field to reduce overwintering populations. Avoid planting in soils that are high in undecomposed organic matter. Do not plant allium crops (onions, garlic, leek) in the same location for a minimum of three years. This will also help to reduce potential disease problems.

**Chemical control** - The only chemical registered for onion maggot control in garlic is Lorsban (chlorpyrifos). Sprays are most effective when applied in the morning (8 to 10 a.m.) or early evening (6 to 9 p.m.). Spraying of weeds immediately surrounding fields will give additional protection against onion maggot.



*Predatory rove beetle*



*Adult fly killed by fungus*

## **Thrips (*Thrips tabaci*, *Frankliniella occidentalis*)**

Onion thrips and western flower thrips are occasional pests in garlic.

### **Identification**

Adults are very tiny, 1 mm long, slender, brown or yellowish with narrow hair-fringed wings. Immature stages are wingless.



*Adult and immature thrips*

### **Life Cycle**

There are three or more generations per year. Adults and nymphs overwinter on plants, debris, legume forage crops, and weeds. Eggs laid into the leaves hatch in 5 - 10 days. Nymphs develop through four stages in 2 - 4 weeks. The first two stages feed on the plant and the later two non-feeding stages complete development in the soil. Hot dry weather favours thrips outbreaks.

### **Damage**

Thrips feed by rasping and sucking juices from plants, causing silvery streaks and speckling of leaves. Severe damage may lead to distorted or undersized bulbs or wilting and death of plants. High populations can lead to damage in storage.



*Thrips damage to stored garlic*

### **Monitoring**

Use white or yellow sticky traps along field edges to monitor initial migration into fields. Inspect leaves or whole plants with a hand lens. Thrips are more of a problem in onions than garlic. There are no established thresholds for garlic. A threshold of 1 - 2 per leaf or 30 per plant is suggested in onions.

### **Control**

**Cultural control-** Remove cull piles, plant debris and volunteer plants from the field. Delay controlling weedy areas until they begin to dry out. Controlling weedy areas after plant emergence may increase thrips problems. Sprinkler irrigation can help suppress thrips. Avoid planting near crops that harbor thrips such as alfalfa, wheat or clover.

**Chemical control** – Malathion, Matador, Silencer, Delegate, Success, Entrust, Movento, Exirel, Agri-Mek are registered for the control of thrips.

## **Garlic Bulb Mites (*Rhizoglyphus* spp., *Tyrophagus* spp.)**

**Identification** – Oval, shiny, creamy white, brown legs, 0.5 - 1.0 mm long.

### **Damage**

Bulb mites are associated with physical damage such as bruising or cutting. They penetrate the outer layer of bulb tissue allowing entry of rotting organisms. They are usually found in groups underneath scales and at the base of the roots. Damage results in small, raised brown blisters on cloves under the skin. They can reduce garlic stands, stunt plant growth, and promote rot in stored garlic bulbs.



*Garlic bulb mites and damage*

## Monitoring

Cut the base of the bulb, peel the outer scales and examine bulb mites with a hand lens.



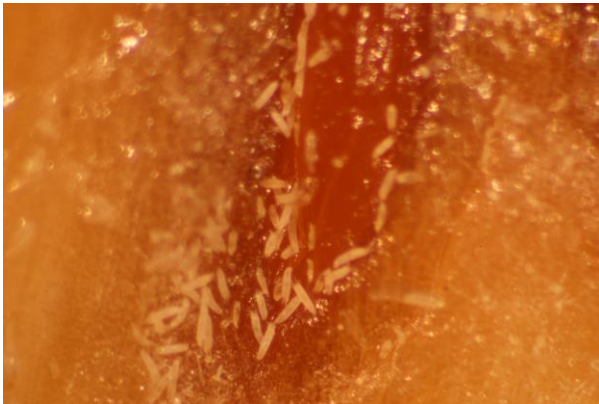
*Peeled garlic scales with bulb mites*

## Control

**Cultural control** - Fallow fields to allow the complete decomposition of organic matter. Do not use infested garlic for seed. Good sanitation practices, rotation with non-onion crops can help reduce infestations. Thorough sanitation of areas where bulbs have been stored is recommended. No insecticides are registered for bulb mite control.

## Dry bulb, tulip or onion leaf mite (*Aceria tulipae*)

**Identification** - Tiny microscopic banana-shaped mites.



*Dry bulb mites on garlic*



*Dry bulb mite damage to garlic*

## Life Cycle

Eggs, nymphs, and adults overwinter on infected garlic in storage and can also survive in the soil.

## Damage

Infested plants develop curling and yellowing leaves. Mites are found along the midrib on the upper surfaces of leaves. Feeding on cloves results in sunken brown spots and drying in storage.

## Hosts

Onions, garlic, leeks, and tulips.

## Control

**Cultural control** - Plant clean garlic seeds. Infested garlic is the major source of infestation in the field. Rotate field with non-onion crops where possible. Hot water treatment of bulbs at 55°C for 10-20 min, or 60°C for 10-15 min prior to planting can reduce mite populations. Hot water treatments can reduce germination. Remove infested plants and harvested debris from the field.

**Chemical control** - Disinfect cloves by dipping them in a miticide or insecticide.

## Other Insects

Two fly species, *Chaetopsis massyla* and *Muscina levina* were caught on traps in two farms. These flies breed in rotting plant material and are secondary invaders of damaged stems and bulbs. The farms with *C. massyla* and *M. levina* reported estimated losses of 25-35% in 2013 and 30% in 2014; respectively. The losses in the two farms could have been due to excessive moisture since no damage was reported in 2015.



*Chaetopsis massyla* flies



*Muscina levina* flies



Damage to garlic seedling by *Muscina levina* larva



*Muscina levina* puparium

Flies, Photo courtesy of Tamara Richardson, Cornucopia Crop Consulting, Cawston.

## Acknowledgement

We would like to thank Dr. Gary Judd, Summerland Research and Development Centre for his help with the project and Dr. Brad Sinclair, Agriculture and Agri-Food Canada, Ottawa, for identification of *Chaetopsis massyla*, *Muscina levina*, *Aceria tulipae* and *Delia antiqua*. Thank you to all participating growers for access to survey sites and attendance at workshops, and to BC Fruit Growers Association for administrative support. Funding for this project has been provided by the BC Ministry of Agriculture and Agriculture and Agri-Food Canada through *Growing Forward 2*, a federal-provincial-territorial initiative

Prepared by

<sup>1</sup>Susanna Acheampong and <sup>2</sup>Tamara Richardson

<sup>1</sup>BC Ministry of Agriculture, Kelowna

<sup>2</sup>Cornucopia Crop Consulting, Cawston

April 2016

