

# *Charidotella sexpunctata bicolor*

**INVASIVE SPECIES ATTACKED:** Field bindweed (*Convolvulus arvensis* L.)  
Hedge false bindweed (*Calystegia sepium* (L.))

**PREVIOUSLY KNOWN AS:** *Metriona bicolor*

**TYPE OF AGENT:** Foliar feeding beetle

**COLLECTABILITY:** Not available for general distribution

**ORIGIN:** North America

## DESCRIPTION AND LIFE CYCLE

### Adult:

*Charidotella sexpunctata bicolor* adult beetles have flattened, oval, and convex shaped bodies, measuring 5-7 mm long. Their body has a flattened skirt around the lower edge which completely shields their head and yellow legs. Initially they are yellow-brown coloured, turning gold or bronze after 10 days, which coincides with sexual maturity. Their highly reflective, changing colouring is an optical illusion. Their outer body cuticle is translucent and light reflects through a layer of liquid. The colour change depends on the amount of liquid between the layers, during autumn and winter they become less radiant with iridescent colouring flecked through orange and bronze. They can regulate their colouring and do so as a reaction to fright, danger, and stress or moisture loss, temporarily replacing their brilliant gold colour with orange. Adults may also have six black spots, three per side, which they can lose or develop within hours. As well, they can retract their antennae when they are threatened. Overwintering adults emerge when higher temperatures arrive in mid-May and the summer generation appears in late summer or early fall. Both generations feed on bindweed



Fig. 1. *C. sexpunctata bicolor* adults



Fig. 3. *C. sexpunctata bicolor* egg

leaves, cutting irregular holes within the margins and between the leaf veins. Females oviposit eggs singly onto host plants in May, June or July.

### Egg:

Eggs are dirty white coloured, measuring 1.2 x 0.6 mm. Incubation takes 8-14 days.

### Larva:

The larvae are yellow-orange coloured. The young larvae have numerous protrusions radiating from their body,

giving them a frilled or spiny appearance. As they mature, the larvae molts and the cast off skins accumulate on to a fork-like appendage at the rear of their abdomen. Feces are added to the shed skins which are held over their back, producing a "parasol-like" appearance. When the larvae are disturbed, they wave the "parasol" to intimidate or divert danger. This shed skin and fecal structure becomes a blackened mass which may further discourage predators as it appears more like bird droppings than an insect. The larvae emerge between May and July and develop over 17-23 days. The youngest larvae feed on the underside of leaves creating skeleton feeding and the older larvae cut feeding holes through the leaves.

### Pupa:

Pupation generally occurs in the soil. As an alternative, they may also pupate on leaves or surrounding objects. Pupation is complete within 8-10 days.

### Overwintering stage:

Adults overwinter near the plants in the soil or in debris starting mid-September.



Fig. 2. *C. sexpunctata bicolor* adult with visible translucent outer coating and spots

## EFFECTIVENESS ON HOST PLANT

Adults and larvae feed on leaves. Young larvae produce skeleton-like damage, whereas older larvae and adults create irregular holes between the leaf veins. They will sometimes consume entire leaves. *C. sexpunctata bicolor* are strictly foliar feeders and provide only marginal impact to the plant. However in some instances, hot summer temperatures combined with ravenous larvae and adult appetites, may contribute to plant collapse, therefore, preventing flowering and seed production.

## HABITAT AND DISTRIBUTION

### Native:

*C. sexpunctata bicolor* is native to North America, United Kingdom and east Africa. It is unknown when and who first brought it to the Pacific Northwest. It commonly inhabits meadows, grassy areas and gardens.

### North America:

Although it is found throughout North America, its native range is eastern United States and southeastern Canada.

### British Columbia:

*C. sexpunctata bicolor* has been released and found established only in the Coastal western hemlock biogeoclimatic zone.

## BRITISH COLUMBIA RECORD

### Origin:

*C. sexpunctata bicolor* field releases made in B.C. originate from Canadian stock collected in Ont.

### History:

*C. sexpunctata bicolor* was first introduced into B.C. in 1969 and then again in 1970. A small number were brought to the University of British Columbia specifically for lab study. In 1971, there was a field release in the lower mainland on hedge bindweed, but to date establishment has not been confirmed at this release site. In 2007, the beetles were found dispersed in Chilliwack and have since been found at several dispersal locations in the Fraser Valley. No collection or redistribution activities have occurred due to some recent indication that the beetles may feed on crop plants.

### Field results:

In 2007, a possible dispersal sighting occurred in the Fraser Valley. Specimens were collected in 2010 and positively identified as *C. sexpunctata bicolor* and not the closely resembling *Deloyala guttata* also released in B.C. on field bindweed and hedge false bindweed. At this time the beetles have only been found on hedge false bindweed. When adult and larva occur in large quantities, their feeding creates a 'lacy' appearance on the leaves.



Fig. 4. *C. sexpunctata bicolor* adult and larva feeding damage on false hedge bindweed



Fig. 5. *C. sexpunctata bicolor* dispersal location in Chilliwack (Coastal western hemlock zone)



Fig. 6. *C. sexpunctata bicolor* dispersal location in Abbotsford (Coastal western hemlock zone)

## NOTES

- *C. sexpunctata bicolor* requires higher temperatures and a longer period for development than *Deloyala guttata*.
- It may also be known as *C. bicolor*, which is a subspecies of *C. sexpunctata*. All the species naturally found in Canada are subspecies bicolor.
- In addition to feeding on bindweed there are rumours that *C. sexpunctata bicolor* also attacks milkweed and several crop plants including raspberry, corn, eggplant and sweet potato. Early emerging adults will feed on *Solanum* weeds before moving onto more desirable plants. It is considered a garden pest as it feeds on morning glories and other related plants.

## REFERENCES

1. Bartlett, T., H. Nendick-Mason and R. McLeod. 2005. Species *Charidotella sexpunctata*-golden tortoise beetle. Updated June 2, 2005. <http://bugguide.net/node/view/8826?printable=1> (Accessed July 26, 2005).
2. Entomology Texas A&M University. Tortoise beetle. Texas A&M Agrilife Extension. <http://texasinsects.tamu.edu/bimg195.html> (Accessed Feb. 24, 2015).
3. Hull-Sanders, H.M., A.G. Appel, M.D. Eubanks. 2003. Comparative water relations of adult and juvenile tortoise beetles: differences among sympatric species. Elsevier, Comparative Biochemistry and Physiology Part A, 135: 625-634.
4. Laliberte, A.S. 1994. Field bindweed (*Convolvulus arvensis* L.) and its control, with an emphasis on biological control. The University College of the Cariboo, Dept. of Natural Resource Science, work term report, fall 1994.
5. Kulzer, L. 1994. Golden tortoise beetle. Updated June 16, 2005. Bug of the month: September 1994. <http://crawford.tardigrade.net/bugs/BugofMonth08.html> (Accessed July 26, 2005).
6. Maw, M.G. 1984. Part 1, Ch. 34, *Convolvulus arvensis* L., field bindweed (Convolvulaceae). In Biological Control Programmes Against Insects and Weeds in Canada, 1969-1980. J.S. Kelleher and M.A. Hulme (editors). Commonwealth Agricultural Bureaux, England.
7. Murray, T. 2005. Golden tortoise beetle. Garden Friends & Foes. <http://whatcom.wsu.edu/ag/homehort/pest/GTB.htm> (Accessed June 5, 2005).