

## *Metzneria lappella* L.

**INVASIVE SPECIES ATTACKED:** Common burdock (*Arctium minus* (Hill) Bernh)  
Great burdock (*A. lappa* L.)

**TYPE OF AGENT:** Seedhead feeding moth

**COLLECTABILITY:** Not permitted

**ORIGIN:** Eurasia

### DESCRIPTION AND LIFE CYCLE

#### Adult:

*Metzneria lappella* adults have a wing span of 1.2 to 1.9 cm and are generally light yellow-tan coloured with variability in the streaking and colour pattern<sup>8</sup>. The forewing is tan with yellow-brown streaks with heavy streaking occurring along the front margin (costa, one of the major longitudinal veins). A row of short diagonal streaks run toward the inner forewing margin where the costal vein and the outer margin of the forewing meet. A slight arc may also occur between one to two thirds of the wing length and a dark spot is located along the inner margin of the wing. The hind wing is lance-shaped with a wide fringe. The top of the head and thorax are pale coloured with a thin dark line running down the center. The labium palps (sensory segmented appendages arising from the mouth parts used for tasting food) are long and recurved over the head and their antennae are long and have many narrow dark rings<sup>5</sup>. *M. lappella* is capable of only one generation per year<sup>5, 10</sup>.

In the northern parts of their distribution, the adult moths begin to emerge in late June and continue to do so through the first three weeks of July then lay their eggs into the developing flowerheads. In the south, adults may emerge from April to August<sup>5, 8</sup>. Research indicates the unpredictability of seed production causes the emergence of adult *M. lappella* to mimic the biennial nature of the host plant. There is some speculation that female insects may have a mechanism to detect flowerheads that have the potential to develop more seeds than other flowerheads. This can subsequently result in higher larvae densities per seedhead in years when greater seed producing flowers are present<sup>1</sup>.

#### Egg:

Currently there is no information available regarding the egg's description or the incubation period. Based on the adult emergence period occurring from early to mid-summer and the larva development months occurring from early fall to early spring, it is presumed the eggs begin to hatch shortly after ovipositing occurs.

#### Larva:

*M. lappella* larva are grub-like and have a plump, white body with prominent segments with fine transparent hairs (setae)<sup>3, 5</sup>. It has a brown head with a white triangular mark on both sides. Its thoracic legs are similar to its body color. One pair of poorly developed (vestigial) anal prolegs is clasped together and located near the posterior end of its body. The larva feed on the developing seeds from September through to the following April. Because the seeds are aligned vertically, each larva is capable of destroying several seeds as it tunnels through them<sup>3</sup>. By January, the developing larvae are about 4.5–5.0 mm long<sup>5</sup>. The overwintering hibernaculum is a thin, dirty-white, horizontal, silken tube<sup>3</sup>.

#### Pupa:

Pupation occurs inside the seedhead during the spring<sup>5</sup>.

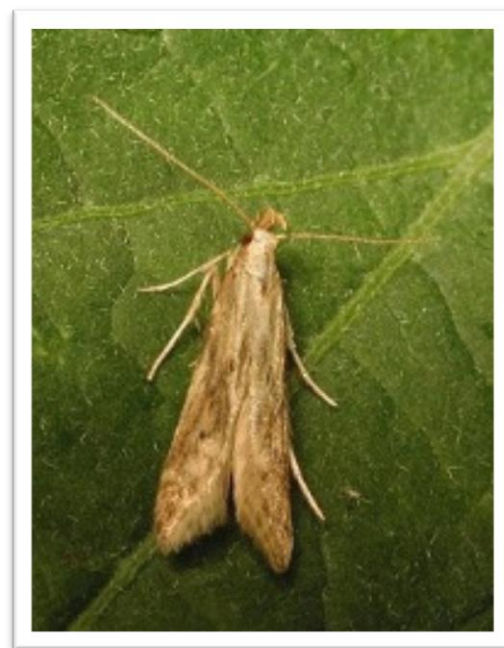


Fig. 1. *M. lappella* adult (credit Fletcher, (UK Moths). See notes.



Fig 2. *M. lappella* larva

### Overwintering stage:

*M. lappella* overwinter in the larva stage in a protective hibernaculum inside the seedhead<sup>8</sup>.

## EFFECTIVENESS ON HOST PLANT

A single *M. lappella* larva is capable of destroying two to fifteen seeds as it enters the vertical sides and feeds through them causing them to fuse together from an adhesive-like substance which can indicate the presence of *M. lappella* larva or pupa<sup>2,3</sup>. During the early stages of larval development, the larva may only occupy one seed. When the larvae initially enter a seed they create a circular entrance hole which can be observed to detect young larva presence when they have not yet moved on to feed on more seeds (Kimber 2008). In a study carried out in Ohio, Purrington and Stinner (1989) recorded the presence of 250 *M. lappella* larvae in 100 burrs collected. *M. lappella* may be more effective on *A. minus* than on *A. lappa*. For example, it was determined that *M. lappella* reduced seed production in *A. minus* by 28 to 71 percent. Comparatively, the seed reduction in *A. lappa* was only 15.5%<sup>2</sup>. This same study showed that 34% of *A. lappa* burrs and 80 to 90% of *A. minus* burrs were attacked by *M. lappella* with the average larvae density within *A. lappa* was 0.6 per burr, whereas the average within *A. minus* was 1.4 to 4 per burr<sup>9</sup>.



Fig. 3. *M. lappella* larvae in hibernaculum

## HABITAT AND DISTRIBUTION

### Native:

*M. lappella* is native to Eurasia occurring in the Palearctic region north towards the Polar Circle<sup>10</sup>. In the United Kingdom it is common in southern and northern England and Wales, but less common in Scotland<sup>3</sup>.

### North America:

*M. lappella* has been recorded present in North America for over a century (Landry pers. comm. May 2011). There is speculation *M. lappella* may have arrived in Que. Canada from Europe in the late 19 century, but, it is more likely it became established in North America on the Atlantic coast soon after early settlers arrived<sup>7</sup>. According to Harris (pers. comm. 1980), *M. lappella* is found throughout Canada, including B.C. The moth has naturalized itself in North America and in the United States it is found where ever the host plants are established<sup>7</sup>. Some known habitats include fields, roadsides, and waste places<sup>5</sup>. In Canada, *M. lappella* collections were made in 1968 in Winnipeg, Manitoba, and may therefore have good tolerance for cold winter conditions and cool climates<sup>7</sup>.

### British Columbia:

*M. lappella* is adventive to North America and is not screened or approved for biological control purposes in Canada, therefore, limited work has been carried out to determine the extent of its dispersal in B.C., its preferred habitat type, or any limitations it may have. The current in-house and Royal B.C. Museum records indicate it is established in the Bunchgrass, Cedar western-hemlock, Interior Douglas-fir, Ponderosa Pine, Montane spruce and Sub-boreal spruce biogeoclimatic zones.

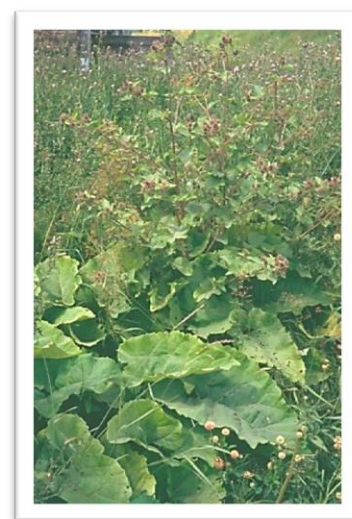


Fig. 4. *M. lappella* habitat (Interior Douglas-fir)

## BRITISH COLUMBIA RECORD

### Origin:

The exact origin of *M. lappella* in B.C. is unknown.

### History:

Royal B.C. Museum records indicate the first B.C. specimens collected date back to 1929. These early collections were obtained from the Goldstream, Victoria and Saanich areas of Vancouver Island. Subsequent Royal B.C. Museum collections include one specimen collected from Port Alberni in 2009<sup>4</sup>. Ministry records show some intermittent collections occurring in 1980 and 1984 in the North Okanagan and later in 2010 from McLure and Barriere areas.

### Field results:

Early Ministry work shows that it has been found in the Southern Interior of B.C. occurring at several sites in the North Okanagan, the North Thompson, in the Fraser Valley, and on Vancouver Island, or more specifically, near Barriere, McLure, Mission, Port Alberni, Victoria, Goldstream, and Little Saanich Mountain. Detailed data only occurs for two of the sites (near Barriere and McLure), therefore, little information is available to summarize results. *M. lappella* has been

found in small burdock infestations ranging from 0.05 to 0.0001 ha. It has been found only on sites where plants were growing at a rate of less than one plant per square meter. This may partly be due to the size of the plant that may limit its ability to develop into thick stands in some habitats. These two sites had highly variable ground cover. One site had some exposed soil between the plants, whereas the second site had no bare ground exposed. At one site the main competing plants consisted of seeded forage, including orchard grass, timothy, clover, and blue grass. At the second site the main competition was both native and seeded grasses. In addition, the Port Alberni site is recorded to be established in a farm meadow surrounded by conifers. *M. lappella* was found on burdock growing in full sun and in filtered and rotating shade situations - the shade was from a mix of deciduous and conifer trees. To date, *M. lappella* has only been found occurring on burdock growing on relatively flat sites with no aspect. The sites sampled show *M. lappella* occurring at elevations between 100 m and 597 m. However, the earliest records maintained by the Royal B.C. Museum have not identified the elevation, therefore, it is possible its elevation may range be lower than 100 m at the site occurring on Vancouver Island. *M. lappella* was found at sites occurring in mesic to sub-hygic locations. The known dispersal sites for *M. lappella* were found to have either a clay-loam or a sandy loam soil. A site on private land also had a significant amount of organic matter occurring. Of the known sites that *M. lappella* occurs in B.C., it has been found where low to heavy snow accumulations occur during the winter months. One site north of Kamloops often has exposed soil for some of the winter months. One site sampled occurred in a farm type habitat that was subject to almost constant disturbance by horses. Manual control was also often implemented as an attempt to control the host plants.

## NOTES

- The entire host plant range for *M. lappella* is unknown at this time.
- *M. lappella* is closely related to the biological control agent *Metzneria paucipunctella* released in B.C. on spotted knapweed (Harris pers. comm. 1984)
- A Canadian study points to *M. lappella* as a potential contributor to bird behaviour on, and potentially their entanglement in, burdock species<sup>9</sup>.
- In B.C., parasites such as predator wasps have been found sharing burdock seedheads with *M. lappella* which may limit the moth's efficacy.
- Figure 1 has been cited according to the contributor's specified requirements as of 2015-03-04.

## REFERENCES

1. Fletcher, C. 2008. *Metzneria lappella*. UKmoths. <http://www.ukmoths.org.uk/show.php?ud=1066%detail+true> (Accessed April 9, 2015)
2. Forsyth, S.F. and A.K. Watson. 1985. Predisersal seed predation of Canada thistle. *The Can. Entomol.* 117: 1075-1081.
3. Hawthorn, W.R. and P.D. Hayne. 1978. Seed production and predisersal seed predation in the biennial composite species, *Arctium minus* (Hill) Bernh. and *A. lappa* L. *Oecologia*, 34(3):283-295.
4. Kimber, I. 2008. 724 *Metzneria lappella* (Linnaeus, 1758). UKmoths. No update. <http://www.ukmoths.org.uk/show.php?ud=1066%detail+true> (Accessed August 11, 2008).
5. Klinkenberg, B. (Editor). Undated. *Metzneria lappella*. E-Fauna BC: Electronic Atlas of the Fauna of British Columbia (efauna.bc.ca). Lab for Advanced Spatial Analysis, Dept. Geog., Univer. B.C., Vancouver. <http://linnet.geog.ubc.ca/efauna/Atlas/Atlas.aspx?sciname=Metzneria+lappella> (Accessed March 3, 20014).
6. McLeod, R. 2008. Species *Metzneria lappella*-burdock seedhead moth-Hodges#1685. BugGuide, Iowa State Univer. Updated June 27, 2008. <http://bugguide.net/node/view/90442?printable=1> (Accessed May 17, 2010).
7. Purrington, F.F. 1979. Biology of hyperparasitic wasp *Perilampus similis* (Hymenoptera: Perilampiade). *The Great Lakes Entomol.*, 12(2): 63-66.
8. Purrington, F.F. and D.H. Stinner. 1989. Wasp parasites of the burdock seed moth, *Metzneria lappella* Zeller (Gelechiidae): new host record for *Bracon mellitor* Say (Hymenoptera: Braconidae). *In Proc. Entomol. Soc. Washington*, 91(2): 203-205.
9. Scott, D.L. 2005. Lynn Scott's *Metzneria lappella* image. Updated June 27, 2005 <http://www.acleris.com/dls/01685.html> (Accessed August 11, 2008).
10. Underwood, T.J. and R.M. Underwood. 2013. Bird behaviour on and entanglement in invasive burdock (*Arctium spp.*) plants in Winnipeg, Manitoba. *Can. Field-Naturalist*, 127: 164-174.
11. Wikipedia. 2013. *Metzneria lappella*. Updated December 27, 2013. [https://en.wikipedia.org/wiki/Metzneria\\_lappella](https://en.wikipedia.org/wiki/Metzneria_lappella) (Accessed March 3, 2014).