Non-native Starthistle Bee (*Megachile apicalis*) Update

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Summary

- We collected introduced starthistle leaf-cutter bees (*Megachile apicalis*) at MPG Ranch in 2013 and 2014. MPG collections are the first documentations of this species in Montana.
- Starthistle bees show a strong preference for knapweeds/starthistles (*Centaurea spp.*). Starthistle bee capture coincides with spotted knapweed (*Centaurea stoebe*) flowering time at MPG Ranch.
- Starthistle leaf-cutter bees are highly competitive for nesting sites and may out-compete native leaf-cutter bees.

Figure 1. This photo shows the facial features of an MPG-collected female starthistle bee (*Megachile apicalis*). *Skyler Burrows photo*

Introduction
The starthistle leaf-cutter bee (*Megachile apicalis*) is a non-native European species that appears to be rapidly expanding its range in the western United States, and can be considered "invasive". The first known resident starthistle bee population was documented in California in 1984. The species was reported in Canada in 2011. We collected 32 starthistle bees from MPG Ranch in 2013 and 49 in 2014. These collections are the first documentation of this species in Montana.

Floral relationships
Starthistle bees have a strong preference for flowers in the starthistle/knapweed genus (*Centaurea*) of the aster family (Asteraceae). Starthistle bees and introduced European honey bees (*Apis mellifera*) are the two most common pollinators of yellow starthistle (*Centaurea solstitialis*), an invasive plant naturalized throughout much of the U.S. and southern Canada. Although yellow starthistle is largely absent from Montana, the genus *Centaurea* is well-represented at MPG Ranch and throughout Montana by spotted knapweed (*Centaurea stoebe*).

Starthistle bees and European honey bees are thought to facilitate yellow starthistle establishment and spread. A similar relationship (an "invasive mutualism") may hold true for spotted knapweed in areas where yellow starthistle is not present. A study determining the community structure of knapweed flower visitors could yield information on starthistle bees' role in spotted knapweed pollination and spread (McIver, et al. 2009).

Nesting behavior
Like many other leaf-cutter bees, female starthistle bees nest in small, pre-existing holes in trees, hollow twigs, or artificial nesting boxes. Female bees construct linear nests in these holes. Starthistle bee females coat cavity interiors with nectar. They cut leaf pieces of different shapes and carry them to the nest to line brood cells. They use nectar and chewed leaf pulp to adhere leaf pieces to the cavity wall or other leaves. Starthistle bees can use cavities with a variety of internal shapes, possibly due to their use of these adhesives in cell construction. Their native cousins generally require more cylindrical nest holes. Females provision each cell with nectar and pollen, lay an egg within, and cap the cell with additional leaf material. Cells are constructed one-by-one until the female reaches the end of the cavity and caps the nest hole.

Starthistle bees are highly competitive for nesting cavities against other introduced and native leaf-cutter bees. They can be aggressive nest usurpers in habitats limited in suitable nesting cavities, and may displace native cavity-nesting bees.

Occurrence on MPG Ranch
We captured starthistle bees across MPG Ranch in 2013 and 2014; from Baldy summit to the Bitterroot River floodplain. The greatest percentage of starthistle bee captures occurred in late July

and August in 2013 (75%) and 2014 (78%). This period of high starthistle bee capture coincides with knapweed flowering time, as well as other late-flowering aster family plants such as green rabbitbrush (*Chrysothamnus viscidiflorus*) and grey rabbitbrush (*Ericameria nauseosa*).

The widespread distribution of this bee species across different habitats at MPG Ranch suggests that starthistle bees have become naturalized in our area.

Figure 2. Side view of a male starthistle bee (*Megachile apicalis*) *Skyler Burrows photo*

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