

Wheat Stem Sawfly Parasitoid: *Bracon lissogaster*

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Introduction

Data from a recent two-year survey of wheat stem sawfly, *Cephus cinctus* (Norton) (Hymenoptera: Cephidae) indicates that it is a minor or sporadic pest of wheat in South Dakota (Bhusal et al. 2026). These results were consistent with previous surveys that found limited detections of wheat stem sawfly in South Dakota (Shanower and Waters 2006, Beres et al. 2011). There are several potential explanations for why wheat stem sawfly populations are lower in South Dakota compared to some of the neighboring states. One explanation is that the wheat acreage in South Dakota is inadequate to support wheat stem sawfly outbreaks (Rand et al. 2014). Another explanation is that small populations of wheat stem sawfly are present in alternative grass hosts and some wheat fields, but are effectively managed by their natural enemies, which are primarily parasitoid wasps (Nelson 1953, Davis et al. 1955). A total of nine parasitoid species have been identified that attack and parasitize wheat stem sawflies (Nelson 1953, Davis et al. 1955). Of these, there are only two species of idiobiont ectoparasitoids that attack wheat stem sawfly larvae in wheat, one of which is *Bracon lissogaster* (Muesebeck) (Hymenoptera: Braconidae) (Somsen and Luginbill 1956, Morrill et al. 1998). A previous study observed high percentages of parasitized wheat stem sawfly larvae in South Dakota, suggesting that these parasitoids are likely a component of the limited wheat stem sawfly populations (Morrill et al. 1994).

Identification

Adult characteristics (Runyon et al. 2001)

- Orange body color with head sometimes darker (Figure 1)
- Females with ovipositor visible when at rest
- Metosoma is smooth and polished
- First metasomal suture is margined by a weakly sinuate ridge
- Origin of wing vein 'r' before the middle of stigma
- Second submarginal cell is short with a ration of 3RSa to r between 1-2
- Body ranges from approximately 4-6 mm in length



Figure 1. Adult *Bracon lissogaster*. Photo courtesy of RKD Peterson, Montana State University.

Egg characteristics (Somsen and Luginbill 1956):

- Approximately 0.74 mm long and 0.11 mm wide
- Cylindrical and elongated with a slight curve
- Smooth and light gray

Larva characteristics (last stage or instar) (Somsen and Luginbill 1956):

- 13 body segments
- No legs
- Non-segmented antennae
- 4.2 mm long and 1.0 mm wide
- Mouthparts heavily sclerotized

Pupa characteristics (Somsen and Luginbill 1956):

- First generation cocoons are lightly woven and light brown in color
- Second generation cocoons are tightly woven and white in color
- The cocoons are attached to the inside of the wheat stems

Lifecycle

There are two generations of *B. lissogaster* per year (Somsen and Luginbill 1956). During the spring, overwintering larvae pupate, with emergence of the first-generation adults beginning during late June and continuing through late July (Somsen and Luginbill 1956). Adults of the second generation begin emerging in mid-August and continue through early September (Somsen and Luginbill 1956). Adults live approximately 19 days (Somsen and Luginbill 1956). Interestingly, first generation females do not begin ovipositing until 6-8 days after emergence, while second generation females begin ovipositing immediately after emergence (Somsen and Luginbill 1956). Females find wheat stem sawfly larvae that are in the stem of grasses or wheat by touching the plant with their antennae and then repeatedly insert the ovipositor through the stem, paralyzing the host and subsequently laying 1-4 eggs onto or near the wheat stem sawfly larva (Somsen and Luginbill 1956). The eggs hatch approximately 66 hours later, and the larvae begin feeding on the wheat stem sawfly larva's hemolymph by making small lacerations (Somsen and Luginbill 1956). The entire larval stage lasts approximately 6-8 days, and the last instar larvae spin a silk cocoon inside the wheat stem and pupate (Somsen and Luginbill 1956). First generation pupae are noted as being loosely woven cocoons that are light brown, whereas the second-generation pupae are tightly woven and white in color (Somsen and Luginbill 1956).

Parasitism Success

Studies have not been conducted to determine the factors that influence parasitism rates of *B. lissogaster*. For closely related species, rainfall and late emergence timing of the adult parasitoids can reduce parasitism rates (Nelson and Farstad 1953, Holmes et al. 1963). Parasitism after harvest can occur but is less common (Holmes et al. 1963).

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