

2017 Lily Beetle Research Update  
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Lily Beetle Parasitoid Rearing:

One hundred eighty two (182) lily beetle larvae were collected from the research plots in June and July, 2016. The larvae were fed on excised lily leaves and allowed to pupate in plastic containers filled with vermiculite wetted with tap water. Thirty-six (36) adult lily beetles emerged from the pupae. The remaining pupal cells were placed into three containers. The containers were placed in a cooler at 4°C, in total darkness from September 20, 2016 until June 5, 2017. The containers were placed in rearing cages at room temperature and 16:8 light:dark until emergence.

Fifteen (15) adult *Tetrastichus setifer* wasps emerged between June 23 and June 30. These wasps were released at the Reader Rock Garden in Calgary. The emergence of adult parasitoids confirms the overwintering success of *T. setifer* in central Alberta. No wasps were released on the Olds College campus in 2015 or 2016. Therefore, the only possibility is that these wasps are progeny of the wasps released in 2013 or 2014. Therefore, overwintering was possible from 2013 or 2014 to 2016.

Eight hundred sixty (860) larvae were collected from the research plots and Botanic Garden beds in June, 2017. The larvae were placed into a total of sixteen (16) plastic containers filled with vermiculite and moistened with tap water and fed *ad libitum* on excised lily leaves. The larvae were allowed to pupate and the number of adult lily beetles emerging was recorded (Table 1). Significantly fewer adults emerged from the larvae collected from the Research Plots than from the Botanic Garden Beds.

Table 1. Number of Lily Beetle Adults Emerged From Field Collected Larvae

Field Collection Locality	Number of Larvae	Number of Emerged Adults
Botanic Garden Beds	396	122
Research Plots	474	7

The remaining pupae in the containers were consolidated into three containers and placed in a cooler at 4°C on September 15, 2017. These containers will be removed in June 2018 to allow emergence of parasitoids. Emerging parasitoids will be released into the Botanic Garden at Olds College, the Reader Rock Garden in Calgary, and one site in St. Albert, Alberta.

Larval Collection & Dissections:

Nineteen (19) plants, randomly selected from a population of sixty-five (65) plants in the Research Plots were sampled weekly over ten (10) weeks for lily beetle larvae (Table 2). One hundred four (104) larvae collected from the Research Plots were dissected and examined for *T. setifer* larvae (Table 3). An additional one hundred (100) larvae were collected from the Botanic Garden and dissected.

The mean number of *T. setifer* larvae per 4th instar lily beetle larva was 9.2 (Table 3). No *T. setifer* larvae were found in lily beetle larvae collected from the Botanic Garden.

Seven (7) lily beetle larvae were collected from the Reader Rock Garden and dissected. None of the larvae were parasitised.

Table 2. Lily Beetle Larval Collections in the Research Plots at Olds College

Week (sampling begun June 1, 2017)	Number of Lily Beetle Larvae	Mean Number of Larvae per Plant
1	11	0.58
2	21	1.11
3	53	2.79
4	51	2.68
5	53	2.94
6	76	4.00
7	118	6.21
8	53	2.79
9	0	0.00
10	0	0.00

Table 3. Occurrence of *Tetrastichus setifer* Larvae in Lily Beetle Larvae

Locality of Lily Beetle Collection	Lily Beetle Larval Instar	Number of Parasitised Lily Beetle Larvae	Number of non parasitised Lily Beetle Larvae	Parasitism Rate (%)	Mean Number of Parasitoid Larvae per Beetle Larva
Research	2nd	21	15	58	1.9

Plots	3rd	17	12	59	9.8
	4th	39	0	100	9.2
Botanic Garden	2nd	0	13	0	0
	3rd	0	19	0	0
	4th		68	0	0

#### Training:

A summer student was employed to enter all records of lily beetle occurrence in Alberta into the Alberta database managed by Dr. Ken Fry and into the national database managed by Dr. Naomi Cappucino. The student monitored lily beetle populations in the lily plots at Olds College and assisted in rearing larvae for parasitoid monitoring.

#### Extension:

Invited Presentations with Lily Beetle Research Results content:

Calgary Horticultural Society Annual Conference, April 29, 2017

Grow Calgary, June 24, 2017

Saskatchewan Green Trades Show, November 10, 2017