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## **OBSERVATIONS ON PARAGUS QUADRIFASCIATUS [HET.:SYRPHIDAE] IN TONGHUA COUNTY**

**Gao Junfeng**

**(General Station of Agriculture, Tonghua County, Jilin)**

Syrphid flies that consume aphids are one group of natural enemies useful to controlling soybean aphids in Tonghua County. According to field observations since 1985, there are 11 species of syrphid flies, such as: large gray syrphid fly [*Metasyrphus corollae* (Fabricius)], four-striped small syrphid fly (*Paragus quadrifasciatus* Meigen), black scutum syrphid fly (*Ischyrosyrphus laternarius* O. F. Muller), inclined spot bulged forehead syrphid fly [*Scaeva pyrastris* (L.)], short winged thin abdomen syrphid fly [*Sphaerophoria scripta* (L.)], etc.. Among these species, the large gray syrphid fly and four-striped small syrphid fly are dominant species. These two species make up 68.7% of the syrphid flies in soybean fields.

The four-striped syrphid fly has 3-4 generations per year. Mature larvae drill into soil in September and pupate in the earth over winter. Pupae emerge into adults in the next year, from the last ten-day period of April to the first ten-day period of May. In Tonghua county, adults appear in two peaks a year. The first peak appears mid-May to mid-June. The second peak appears in late August. After 2-3 days of emergence adults mate several times. The ovipositing period is about 3-5 days. The peak of egg-laying is within 2-4 days after mating. The eggs are spread to aphid aggression area. Each adult laid 84-142 eggs. The egg stage is about 3-4 days at 20°C, larva stage is about 10 days and pupa stage is about 12days. One generation lasts 25-30 days. Adults fly vigorously from 8:00-11:00 in the morning and from 3:00-4:00 in the afternoon. Adults do not move about or just creep slowly when the temperature is lower than 13°C or higher than 30°C.

The larvae of four-strip syrphid fly could be found among swarms of aphids on rank grass in early May, and later in the last ten-day period of May the first generation larvae start to pupate until the early of June. Different stages of four-strip small syrphid fly appear from late June to mid July. During the rainy season from late July to mid August in Tonghua county the population of aphids is decreasing. The larvae of four-strip syrphid fly enter into the soil and pupate for passing unsuitable environment condition. From late August to early September the flies appear again among aphids in crop fields, vegetable gardens or on rank grass. The flies follow aphids quite rapidly. Normally when aphids have occurred in soybean fields for 2-4

days the adults and eggs of the flies occur as well. The larvae of flies immediately eat aphids after hatching. The population is increased while the amount of aphids is increasing.

According to records of fly eating capacity in fields, each larva eat 53-67 aphids a day, in which first instar larva eat 3-5 aphids a day, second instar larva 10-30 aphids and third instar larva 50-80 aphids. Each fly can eat 500-800 aphids in its lifetime.

The four-strip small syrphid fly preys on aphids, specifically large bean aphid (*Aphis glycines* Matsumura), sorghum aphid [*Melanaphis sacchari* (Zehntner)], maize aphid [*Rhopalosiphum maidis* (Fitch)], cereal aphid (*Rhopalosiphum padi* L.), turnip aphid [*Lipaphis erysimi* (Kaltenbach)] and other kinds of aphids feeding on Chuan Jun grass, wormwood (artemisia), willow tree and motherwort grass, respectively.