Preliminary study in artificial rearing of Chinese citrus fruit fly, *Bactrocera minax* (Enderlein)

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Background

Chinese citrus fruit fly (*Bactrocera minax*) is an univoltine frugivorous specialist. Recorded most from China, the host range is restricted to species of citrus. Adults emerge annually in early May. Females lay eggs in the fruits in July. Larvae develop inside until they drop to the soil, and pupate in early November. Pupal stage enters diapause for overwinter and last 6 months in the field. The current infestation areas covered 8 provinces in South-western and Central China, ranging from temperate to subtropical regions. There has been a outbreak of *B. minax* in 2008 in Sichuan province, which caused several billion dollars economic losses nationwide. The tremendous losses discouraged fruit farmers and caused the Chinese government seek effective measures to control *B. minax*. Laboratory rearing and knowledge of diapause of *B. minax* are key aspects to a potential development of SIT for this species.

Materials and methods

Larval rearing

Larval development usually take five months in the field. The early hatched young larvae are fragile so we kept them to grow inside fruits for about 15 days. Then larvae were transferred to artificial diets. Mature larvae drill out diet and pupate in moist sands (Fig. 4). We used several diet formulations recommended from other fruit flies rearing. Evaluation was carried out based on two parameters: larval developmental duration, and pupal recovery. Young larvae grow well inside different varieties of citrus fruits (Fig. 5).

Embryonic development

The main visible embryonic developmental stages are as follows. Newly laid eggs are filled with white cytoplasm. Over a period of time the internal changes initiate with anterior and posterior of eggs becoming transparent. A series of mitosis occur before some obvious cells with blastomere nuclei appearing in the middle or tip of transparent eggs. These cells reproduce and separate from the posterior of eggs by forming furrow. A series of migrations and divisions commence among its cells. Meanwhile, various parts of embryo acquire characteristics as primordial organs. These complicated processes indicate the beginning of gastrulation. A clearly cephalic furrow occurs at this stage and divides the whole germ-band to protocelphato and protocelphato. Subsequent events take place until blastoinesis. In the phase of blastoinesis, mouthpart segments and spinicular tracheas become visible in both poles of embryo. Fluorescing mid-gut of this phase shows tripartite structure. In the following stage of rapid histodifferentiation, fluorescing mid-gut get thin and integral coiled replacing the initial 3 yolk-filled regions. Pigment deposit in mouth hook and highly developed dorsal tracheas can easily be observed. After histodifferentiation, yolk resorption and onset of muscular activities of larvae arise frequently until hatching.

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