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【Scientific note】

以台灣桑木蝨與外米綴蛾卵為食之安平草蛉之生物特性、捕食力與田間釋放【科學短訊】

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Abstract

摘要

本研究在探討安平草蛉之生活史，各齡蟲發育所需時間及其死亡率，以製成時別性生命表，並計算其內在自然增殖率與測定其防蟲潛力。安平草蛉之幼蟲分別以台灣桑木蝨若蟲與外米綴蛾卵為食餌，成蟲則以酵母粉與蜂蜜之混合物為食。以外米綴蛾卵為食之安平草蛉幼蟲發育所需時間及生活環均較以桑木蝨若蟲為食者為短。以桑木蝨若蟲為食之安平草蛉，其平均世代時間為54.2天，繁殖率為每日每雌蟲產12.74粒卵。安平草蛉幼蟲之捕食力以每一幼蟲對桑木蝨若蟲的捕食量表示之；第一齡至第三齡幼蟲平均每日捕食量依次為5.60、13.96、62.87隻；整個幼蟲期間，每隻幼蟲平均總捕食量為437.75隻，平均每日捕食量為32.80隻。安平草蛉之內在自然增殖率為每日每雌蟲產生0.096隻雌性後代，且其棲群在一平均世代時間54.2天內淨增殖181.5倍。於田間半控制之微生態網籠內，測定安平草蛉作為台灣桑木蝨生物防治因子的潛力試驗，藉以評估本捕食性天敵的效果。在所有供試天敵一害蟲不同釋放比中，以“釋放4隻安平草蛉幼蟲”比“158個桑木蝨棲群生物量指數”之釋放比較為經濟有效。

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BIOLOGY, PREDATION, AND FIELD-CAGE RELEASE OF *CHRYSOPA BONINENSIS* OKAMOTO ON *PAUROCEPHALA PSYLLOPTERA* CRAWFORD AND *CORCYRA CEPHALONICA* STANTON

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ABSTRACT

Larvae of the green lacewing, *Chrysopa boninensis* Okamoto were reared at the constant temperature on prey regimes of *Paurocephala psylloptera* Crawford and *Corcyra cephalonica* Stainton. All the tested adults were maintained in a water paste of yeast and honey mixture. The durations of immature stadia and life cycle of lacewings feeding on the larval diet of *C. cephalonica* were shorter than those of lacewings feeding on *P. psylloptera*. The mean generation time (54.2 days) and the reproductive rate (12.74 eggs per female per day) for the lacewings were measured from the predators preying on *P. psylloptera*. The lacewing's life table, intrinsic rate of natural increase, and predation were calculated and the field-cage releases of lacewings were used to evaluate the predatory performances on *P. psylloptera*.

Predation potential of *C. boninensis*, expressed as the number of prey of *Paurocephala psylloptera* consumed per larva per day, was an average of 5.60, 13.96, and 62.87 prey per day for 1st, 2nd, 3rd stage larvae, respectively. An average predation potential of *C. boninensis* was 437.75 prey consumed per larva and 32.80 prey consumed per larva per day.

The intrinsic rate of natural increase was 0.096 female individual per female per day for *C. boninensis*. The population of *C. boninensis* multiplied 181.5 times in a mean generation time of 54.2 days. A field-cage release of both populations of *C. boninensis* and its prey, *P. psylloptera*, was used to evaluate the potential of *C. boninensis* as a biocontrol agent on its prey.

A biomass index of prey was used to standardize the prey consumption rate of the predator on the prey. The calculation of the indices as mainly depending upon the length (L) and width (W) of prey and the formula of calculating indices was $V = \frac{4\pi}{3} \times L \times W^2$. A release of 4 *C. boninensis* to 158 prey population biomass indices was the best tactics to suppress the prey population.

以台灣桑木蝨與外米綴蛾卵爲食之安平草蛉 之生物特性、捕食力與田間釋放

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本研究在探討安平草蛉之生活史，各齡蟲發育所需時間及其死亡率，以製成時別性生命表，並計算其內在自然增殖率與測定其防蟲潛力。

安平草蛉之幼蟲分別以台灣桑木蝨若蟲與外米綴蛾卵爲食餌，成蟲則以酵母粉與蜂蜜之混合物爲食。以外米綴蛾卵爲食之安平草蛉幼蟲發育所需時間及生活環均較以桑木蝨若蟲爲食者爲短。以桑木蝨若蟲爲食之安平草蛉，其平均世代時間爲 54.2 天，繁殖率爲每日每雌蟲產 12.74 粒卵。

安平草蛉幼蟲之捕食力以每一幼蟲對桑木蝨若蟲的捕食量表示之；第一齡至第三齡幼蟲平均每日捕食量依次爲 5.60, 13.96, 62.87 隻；整個幼蟲期間，每隻幼蟲平均總捕食量爲 437.75 隻，平均每日捕食量爲 32.80 隻。

安平草蛉之內在自然增殖率爲每日每雌蟲產生 0.096 隻雌性後代，且其棲群在一平均世代時間 54.2 天內淨增殖 181.5 倍。

於田間半控制之微生態網籠內，測定安平草蛉作爲台灣桑木蝨生物防治因子的潛力試驗，藉以評估本捕食性天敵的效果。在所有供試天敵—害蟲不同釋放比中，以“釋放 4 隻安平草蛉幼蟲”比“158 個桑木蝨棲群生物量指數”之釋放比較爲經濟有效。