12-055
OVIPOSITING STRATEGY OF EUPHODES CONFERATER (DIPTERA: SYRPHIDAE) FEEDING ON PSEUDOREGMA BAMBUSICOLA (HOMOPTERA: PEPHIGIDAE) WITH STERILE SOLDIER CASTE
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Recent studies on aphidophagous syrphid flies demonstrated that females, in searching oviposition sites, assess qualitative and quantitative value of aphid colonies as suitable and sufficient food resource for their offspring. However, oviposition behavior of syrphid flies feeding especially on soldier-producing aphids is never intensively studied. My study on ovipositing strategy of Euphodes conferrer, which feeds on eusocial aphid Pseudoregma bambusicola with a special soldier caste, demonstrated that female flies selected large colonies for their food and laid eggs on various sites such as fine threads of spider webs and hairy objects in or close to aphid colonies. Since the aphid soldiers were able to attack syrphid eggs using their frontal horns, only the eggs laid on spider threads could escape. Female flies could change their oviposition sites in relation to soldier density. For instance, when the soldier ratio of aphid colonies was high, most of females did not lay eggs in or close to the aphid colonies, but on spider threads near the colonies. In contrast, when the soldier ratio declined (nearly 6%), females laid eggs directly on the colonies. These results possibly suggest that females of E. conferrer select optimal sites for oviposition in response to the density of aphid soldiers.

12-056
THE INTERACTION BETWEEN THE EFFECTS OF TERRITORY AND SEX RATIO ON COPULATION DURATION IN THE WALNUT FLY RHAGOLETIS JUGLANDIS
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Ecological factors such as operational sex ratio (OSR) and territory are known to play important roles in mating dynamics. While most studies address the effect of each factor independently, the interaction between them is seldom considered. Using a combination of field and laboratory assays, we examined the role of both factors in the mating dynamics of the tephritid fly Rhagoletis juglandis. This species is characterized by a resource defense mating system in which males defend walnuts and mate with females that arrive on the fruit to lay eggs. In the field, copulation duration in R. juglandis was distributed bimodally, most copulations being either short (<200 sec) or long (>600 sec). In both field and laboratory, OSR had a strong effect on copulation duration: at male biased sex ratios, copulations tended to be long; at even or female-biased ratios, copulations tended to be short. Individual flies were able to shift copulation duration in response to changes in sex ratio occurring over a scale of a single day. In a final laboratory assay, the effect of OSR on copulation duration was found to depend on the presence of fruit. In the presence of surrogate fruit, the usual effect of sex ratio on copulation duration was expressed; in the absence of such fruit, however, the effect disappeared. In the same assay, the effect of fruit presence on copulation duration depended on OSR. At a female-biased ratio, the presence of a surrogate fruit tended to result in relatively more short copulations. At a male-biased sex ratio, however, the presence of fruit had no effect on copulation duration.

12-057
The Effect of the Oviposition Behaviour on the Fitness of Callosobruchus maculatus (Fab.) (Coleoptera: Bruchidae)
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For the observation of the effect of the oviposition behaviour of bean weevil (Callosobruchus maculatus) on its fitness on azuki beans and mung beans, three strains from Taiwan, 4C6-4, 13M23 and 10CG-8, were used. These geographically different strains showed significant differences in the longevity, the fecundity, the reproduction ability to hosts and the degree of larval competition. Because of the non-feeding culture in adult stage and the lack of the ability of self-dispersion in larval stage, these differences will directly influence the fitness, which was defined as the number of offsprings. All the above reproductive characters were described quantitatively and used to compare the fitness of the three strains among two hosts. A random egg distribution simulated by computer according to the observed fecundity was also compared with the observed egg distributions to enumerate the benefit of the oviposition behaviour. It was found that the female bean weevils of all three strains tended to lay their eggs in a nearly uniform distribution and their fitness was increased by this oviposition behaviour, but the connection between larval competition and egg dispersion was lost. It suggests that although the behaviour of uniform egg dispersion should be a result of selection, the cost of barring this behaviour could be relative low when compared with its benefit.

12-058
NO HOST-QUALITY PREFERENCE BY THE HYPER-PARASITOID, EURYOTOMA SP. (HYMENOPTERA: EURYOMIDAE), FOR THE COOCOS OF THE PARASITOID, COTESIA GLOMERATA (HYMENOPTERA: BRACONIDAE)
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Eurytoma sp. is a solitary hyperparasitoid which attacks Cotesia glomerata cocoons of various ages. Under laboratory conditions of 20°C and 16:8 photoperiod, the number of eggs laid per day in old cocoons was nearly the same as that laid in young ones. However, females laid more male-eggs in old cocoons than in young ones. The developmental period of Eurytoma sp. was longer and the mortality was higher when laid in old cocoons than those laid in young ones. Apparently, the old cocoons were less suitable for Eurytoma sp. than young ones. However, Eurytoma sp. females did not show any preference for good cocoons when offered young and old host cocoons simultaneously. Investigations of C. glomerata cocoons in the field showed that the hosts of many clusters developed relatively equally. Further, the longevity of the female Eurytoma was as long as 2.5 months or more at 20°C. The number of eggs laid in a day by young females was nearly 10. Even old females could lay several eggs in a day. The ability of egg production was considered high for both young and old females. Therefore, under natural conditions, it might be advantageous for females to lay eggs immediately after encountering the host cocoons.