

OR284*Eusocial evolution without fortress defence in aphids***Keigo Uematsu, William Foster**

Nesting has been described as a necessary factor in the evolution of eusociality. Closed nests can exclude predators, enabling efficient colony defence. In 'fortress defenders', nests also provide valuable food sites such that colony members need not forage outside, leading to high intra-group relatedness. Almost all social species form nests: this includes the aphids, where eusociality is correlated with gall-forming. Nevertheless, in some aphid species, sterile soldier castes have evolved in open colonies, where individuals congregate but do not develop a nest structure. These aphids pose an interesting problem about the preconditions for eusocial evolution. However, the ecological and genetic factors that have favoured soldier evolution in these open colonies have been poorly studied. Here, we compare the kin structures of eusocial and non-eusocial aphid species of the tribe Cerataphidini and investigate whether relatedness has promoted eusocial evolution in this group. In addition, we investigated the presence of altruistic behaviour in non-social species. We show that head-butting between colony members, which appears to be fighting behaviour, may in fact be an altruistic behaviour for young nymphs if they are yielding their feeding sites to older nymphs with higher reproductive value. We will discuss why eusociality in open colonies has evolved in only 1% of the 4400 species of aphids.