

## Discussion

The occurrence of so many tramp species, including five new records for Arabia, is alerting and points to a strong effect on the local fauna, especially in areas of high human impact. UAE might be expected to have fewer species than neighbouring Oman and Saudi Arabia because of its smaller size and strictly arid climate, but the paucity of records for the region makes comparisons difficult. However, the number of thermophile or heat-adapted, desert species recorded for UAE is less than a third of the entire Arabian ant fauna (Collingwood & Agosti, 1996) and the impact of introduced ant species may be more far-reaching because species diversity is initially low.

Some ants are particularly invasive. *Linepithema humile* is recorded from California, Portugal, Spain and southern France and has recently reached Genoa, Italy (V. Raineri, pers. com.). Its dominance where it occurs contrasts with its almost complete absence along the North African Mediterranean coast which is probably due to competition with *T. simrothi* (Bernard, 1976). Similarly, although it is widespread in western Australia, competition from local *Iridomyrmex* species is thought to prevent its spread into undisturbed habitats. In the UAE, *L. humile* probably does not compete directly with local ants for modified or disturbed habitats, as in California and western Australia (Ward, 1987), but may be better at establishing colonies in altered habitats. The negative effect of introduced species often goes unnoticed until it is too late to prevent their spread. For example, in Hawaii *L. humile* is considered a threat to local pollinators on which the endemic silversword (*Argyroxiphium* spp.) plants depend. Attempts at control are being suggested in the protected areas to which this rare plant is now confined (Woolliams, 1995). Insect pollinators are important for commercial crops and native plants alike.

The only ants which represent a serious danger to human health are *P. senaarensis* and *S. geminata*. The former is well known to the local population, as suggested by its common name 'Samsun'. It does not sting unless seriously threatened but is a nuisance pest and frequently lives in gardens close to habitation. A species closely related to *S. geminata*, *S. invicta*, has successfully colonized the southern U.S.A., and has almost out-competed the entire local ant fauna, even altering the local insect diversity (das Gupta Jusino-Atresino & Phillips, 1994; Vinson, 1994). Its control has proved difficult, even in the technologically sophisticated and highly regulated U.S.A. (Williams, 1994). *Solenopsis geminata* could cause similar problems in UAE if it occurs more widely than currently known. The colonies found in Dubai have been the subject of a control programme by the local Public Health Department.

We know nothing about the origin of UAE's introduced ants or their subsequent development and spread. However, they now contribute about 20% of all ant species recorded in the UAE (D. Agosti, B. Tigar & C. Collingwood, unpublished data). Their occurrence is highly variable but they are most abundant in relatively mesic environments. Other ants recorded for the UAE are generally found in areas of natural or only slightly disturbed vegetation and introduced ants show an almost complete dominance in areas intensively used and modified by man. For example, during a 2-year study of ground dwelling invertebrates at five desert locations in Abu Dhabi Emirate 1246 records of ants were collected representing over 39,000 specimens, but no introduced species was recorded (Tigar & Osborne, in press). Man-altered habitats are still increasing in UAE, providing further opportunities for the invasion of successful cosmopolitan species of many animals and plants.

Although quarantine regulations can prevent the invasion of introduced species, boats still carry goods from Asia directly to the centre of Dubai. This city has many attractive, irrigated parks and gardens that would provide an easy foothold into Arabia for further invasive species. Local environmental departments should develop routine monitoring programmes for species such as the fire ant or they may enter unnoticed before their harmful effect on local ecology or public health is realized. Information on