

COST Action Short Term Scientific Mission: Alien plant species in Overseas Territories in Cyprus

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Aims and objectives

- I. To resurvey quadrats sampled in 2015 in the Akrotiri forest and adjust for any potential bias due to time of year the plots were sampled, and thus ensuring that our plot records were an accurate reflection of the plant communities found under stands of *Acacia saligna*, *Eucalyptus* spp. and *Casuarina cunninghamiana* within and around the Akrotiri Forest (Fig. 1a).
- II. To survey equivalent areas in the recently restored Fassouri Marsh to provide a comparison with the communities recorded in the afforested marshes of the Akrotiri Forest (Fig. 1b).
- III. To survey *Oxalis pes-caprae* in the Akrotiri Forest to characterise its associated plant communities and other aspects of its favoured habitat (Fig 2a).
- IV. Survey stands of invasive alien species in phrygana habitats, both at Akrotiri and at the Dhekelia SBA (Fig. 2b; Fig. 3). Paired plots in stands of native woody species (primarily *Juniperus phoenicea* and *Pistacia lentiscus*) as well as *A. saligna* and *Eucalyptus* sp. were surveyed in order to better assess whether the effects of alien woody species were different to those of natives.
- V. Completed half-day workshop with Cypriot academics and local conservationists to establish whether, at a local level, invasive alien species, from all taxon groups, were able to be critically assessed using the Common International Classification of Ecosystem Services (CICES) methodology (<http://cices.eu>).



Fig 1. Examples of areas surveyed. 1a. Forested areas, with abundant *A. saligna*. 1b. The northern periphery of the Fassouri marshes)



Fig 2. Examples of areas surveyed. 2a. *Oxalis pes-caprae* beneath an open *Eucalyptus* stand within the Akrotiri forest. 2b. Phrygana/maquis matrix, with *A. saligna* and *Pistacia lentiscus*, within the Dhekelia military base)

Methods

- I. We undertook quadrating, re-locating previous quadrats and marking new locations with Panasonic Toughbook FZ-G1 tablet computers.
- II. Quadrats were either 5 x 5 m but in the case of *O. pes-caprae*, 12.5 x 2 m if this was more suitable for the shape of the stand.
- III. The 0–5 m canopy range was surveyed for all species within plots. The total (i.e. all strata) cover for the three woody alien species (*A. saligna*, *Eucalyptus* spp. and *Casuarina* spp.) was also recorded in order to give an indication of shading. Measure of bare ground and litter depth were recorded in addition to the area of standing water where present.

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Fig. 3. Location of the Sovereign Base Areas of Cyprus; 1 indicates the location of Akrotiri and 2, Dhekelia (© Google maps)

Results

- I. 89 taxa were recorded during the resurvey, compared to 60 taxa previously. Many plots were not more species rich than when recorded in 2015, particularly under dense *Eucalyptus* and *Acacia* stands.
- II. 12 taxa were recorded in these marshland plots. The Cyprus Red Data Book species *Isolepis cernua* and *Phyla nodiflora* were also encountered.
- III. Across all forest plots containing *O. pes-caprae* at low abundance, the average species richness was 6.7.
 - I. In the five plots specially selected for high cover of *O. pes-caprae*, average species richness was 10.7.
 - II. No difference was found in the canopy cover of the main alien woody species of the forest between low abundance *Oxalis* plots and those especially selected for high *Oxalis* cover.
- IV. In phrygana, no richness difference was found between *Acacia*-invaded plots (median 24.5) and plots containing native woody species (median 25.5).
- V. Participants reviewed a CICES example for the benefit of the whole group, and suggested improvements to the methodology. Local assessments for a wider range of species are planned.

Conclusions

- I. Following the survey, neither our previous conclusions regarding the impacts of *A. saligna* in salt marsh communities, nor our previous characterisation of the stands beneath dense *Acacia*, *Eucalyptus* and *Casuarina* in the fresher parts of the marsh, significantly changed.
- II. Our other surveys in and around the forest provided interesting comparative data on both uninvaded, non-afforested marsh, and on stands with dense populations of *Oxalis pes-caprae*
- III. Surveys of invasive aliens in phrygana and maquis habitats indicated limited establishment of *A. saligna* away from compounds and roads.
- IV. Workshop on the evaluation of alien species' impacts on ecosystem services in Cyprus proved a useful exercise for meeting new stakeholders and learning about CICES methodology and outputs arising from this meeting will produce a clear quantification of impacts that can be shared with other stakeholders and lead into publication in a peer-reviewed journal.