

Zoogeography of ants on the Aegean islands

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Introduction

The myrmecofauna of Greece is one of the most diverse in the Mediterranean area, but little is known about its distribution across the many islands of the Greek archipelago.

Past projects [1,2] studying terrestrial arthropods on the Aegean Sea islands have suggested a biogeographical trench, revealed by the faunal discontinuity between the western-central Aegean islands and the islands close to the coast of Asia Minor.

The trench is consistent with the sea level's rise during the Pleistocene which formed a sea-barrier between the two groups of islands.

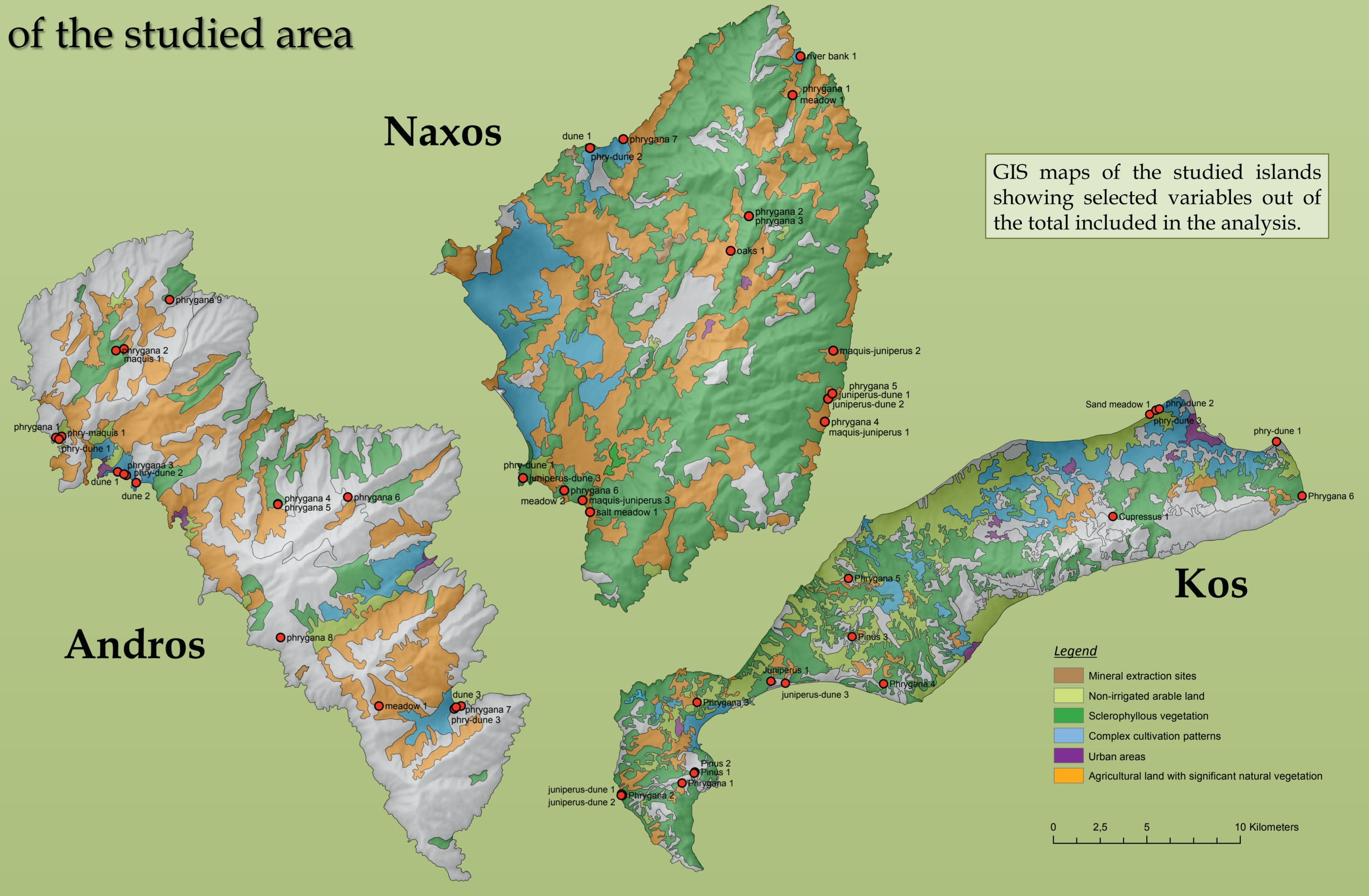
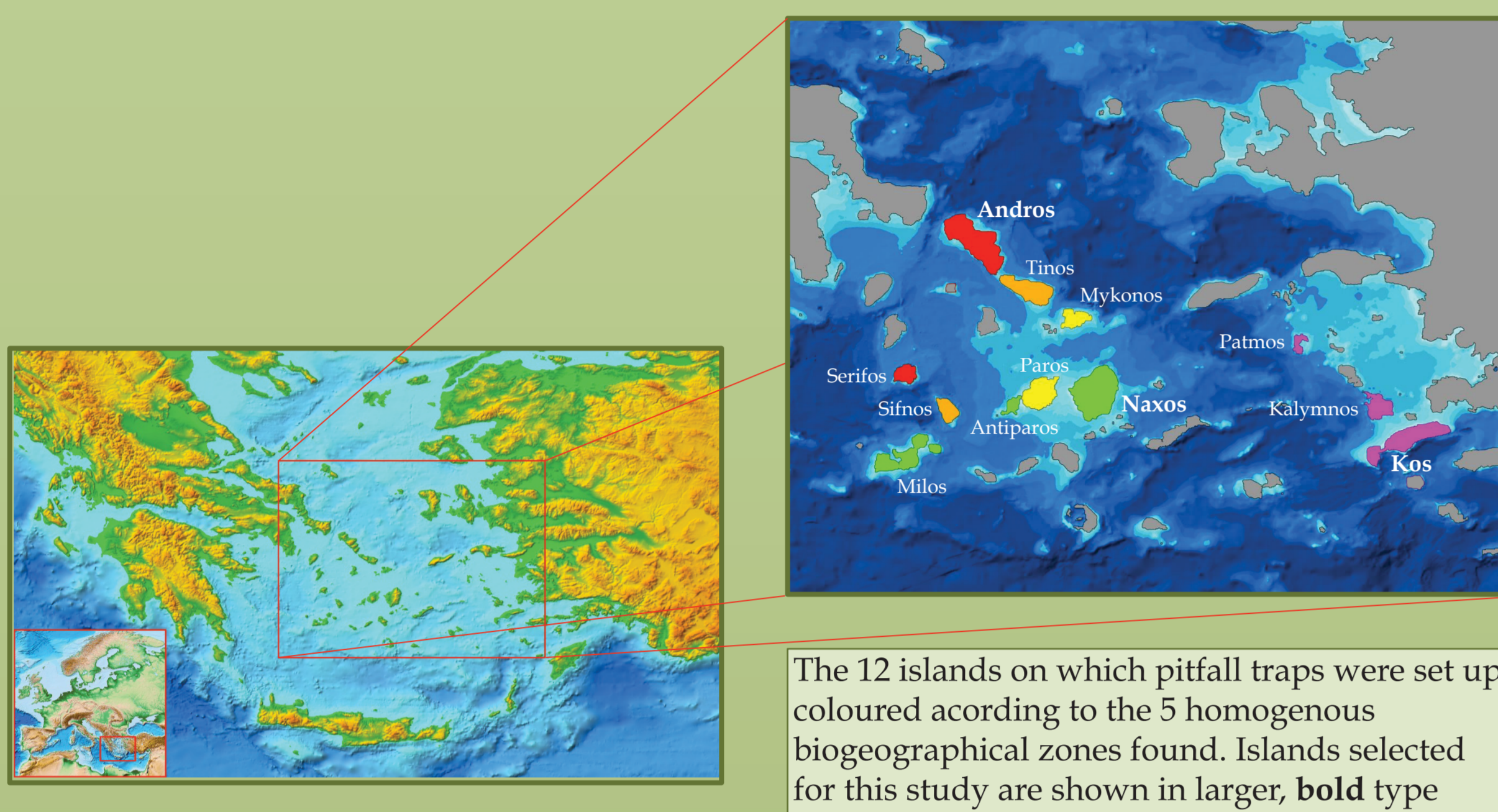
We hypothesize that the composition of the ant assemblages on the Aegean islands follows the same distributional pattern.

Methods

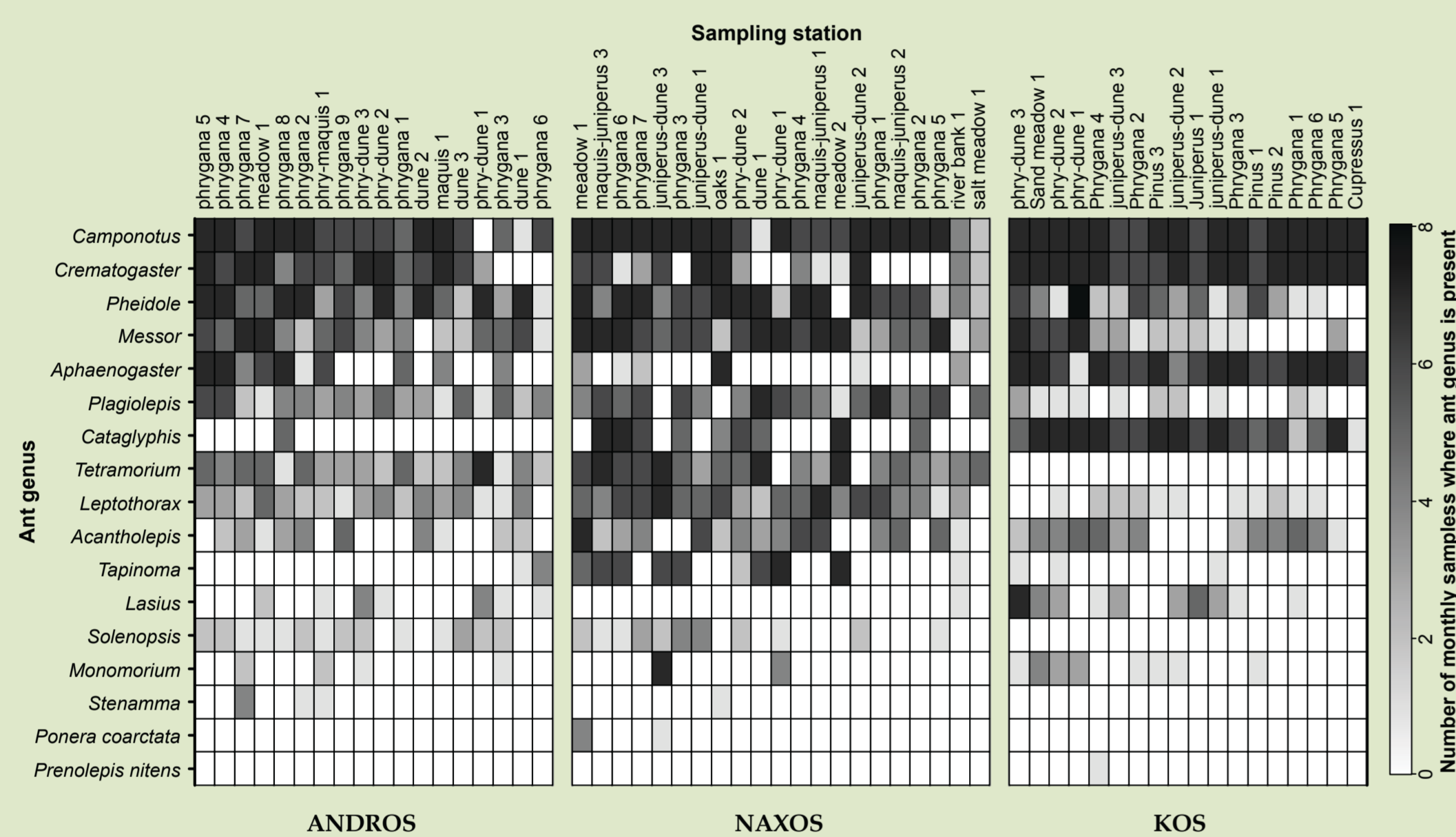
- Pitfall traps were placed on 12 main islands in the Aegean Sea, from April to November 2006.
- A total of 169 pitfall stations set up covering several habitat types.
- The islands form a set of five homogenous biogeographical zones [1,2], from which we picked three islands as representative, from West to East.
- Sorting of ant specimens and preservation in 95% ethanol.

- Taxonomic identification to genus level; key of Agosti & Collingwood (1987).
- **α-diversity**: identification of the diversity indices for each habitat and formulation of occurrence matrix based on the cumulative presence of genera through time.
- **γ-diversity**: grouping of each island's stations and performance of 1)PCA, 2)NMDS, 3)Cluster analysis, 4)One way ANOSIM, 5)SIMPER and 6)Comparison of the diversity indices for the cumulative presence of genera through time.

Maps of the studied area



Results



The figure above is the occurrence matrix of the identified genera's cumulative presence across the seven collection periods. All three islands have distinct patterns though Kos' habitats demonstrate a more structured composition.

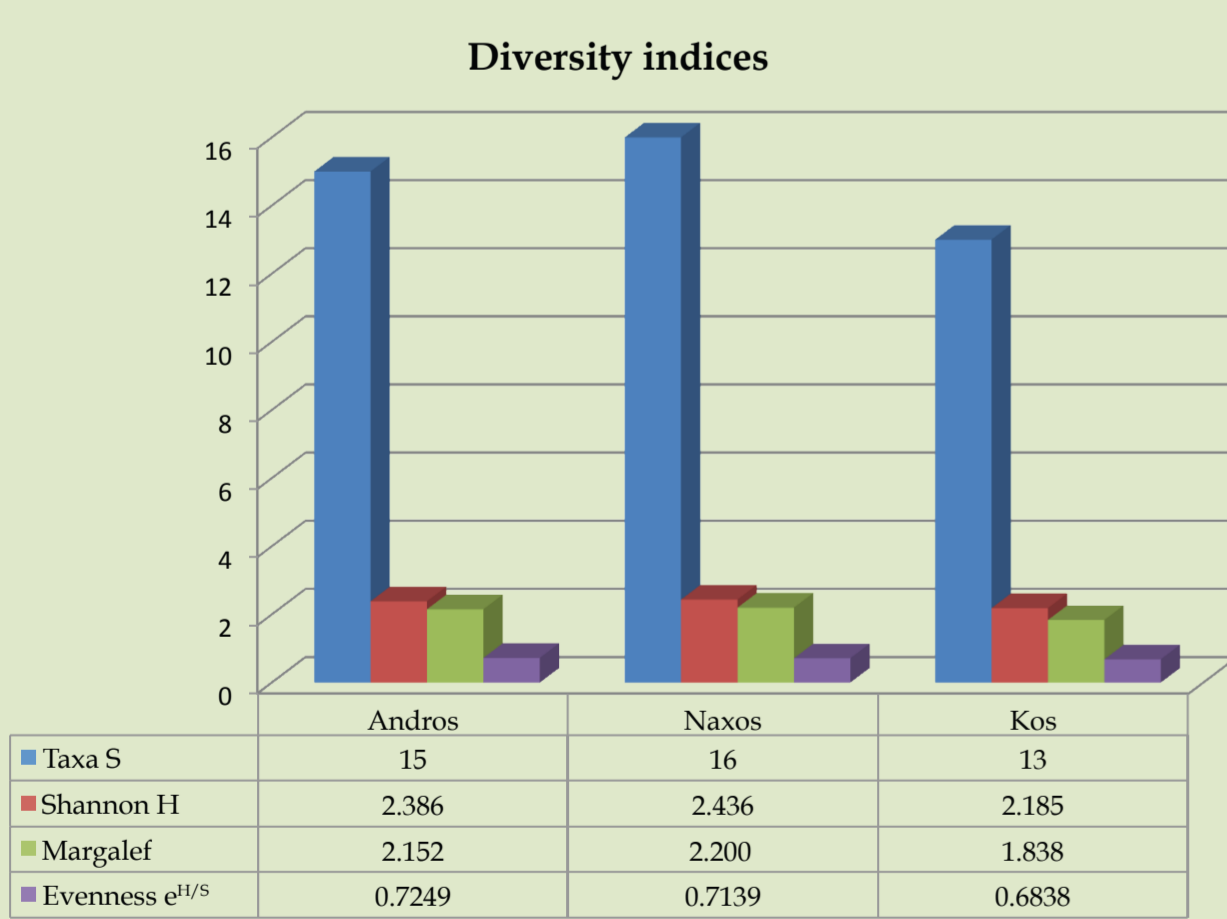
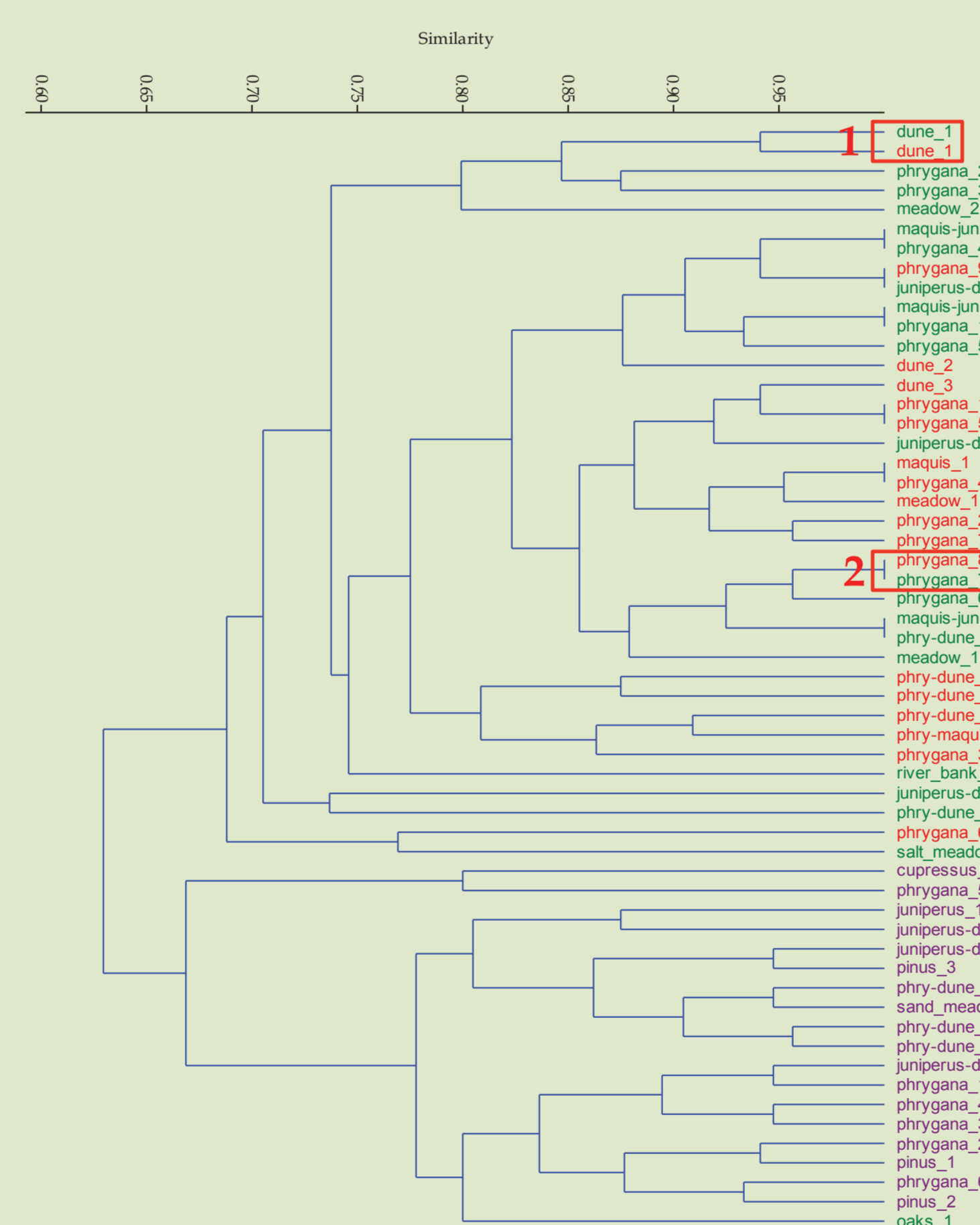


Illustration of selected diversity indices for the studied islands. Naxos is most abundant in genera and appears to hold the higher diversity, followed by Andros.



On the left is a Ward cluster analysis based on cumulative presence across time; similarity was measured with Dice coefficient. The analysis corroborates the PCA result. The habitats of Kos (purple) are more similar among one another than with the habitats of Andros (red) or Naxos (green). In two cases (1 & 2 on the figure), same habitat types in Andros and Naxos show a high degree of similarity. Oaks 1 is differentiated from the rest of Naxos' stations and is grouped with Kos. Due to the presence of the genus *Aphaenogaster* in all the collection periods, the genera composition of oaks 1 converges to Kos' pattern.

	Andros	Naxos	Kos
Andros	0	0.2282	0.7185
Naxos	0.2282	0	0.8207
Kos	0.7185	0.8207	0

Table with the R values measured with Bray-Curtis distance for the One way ANOSIM test. Highest dissimilarity is identified between Kos and Naxos followed by Kos and Andros.

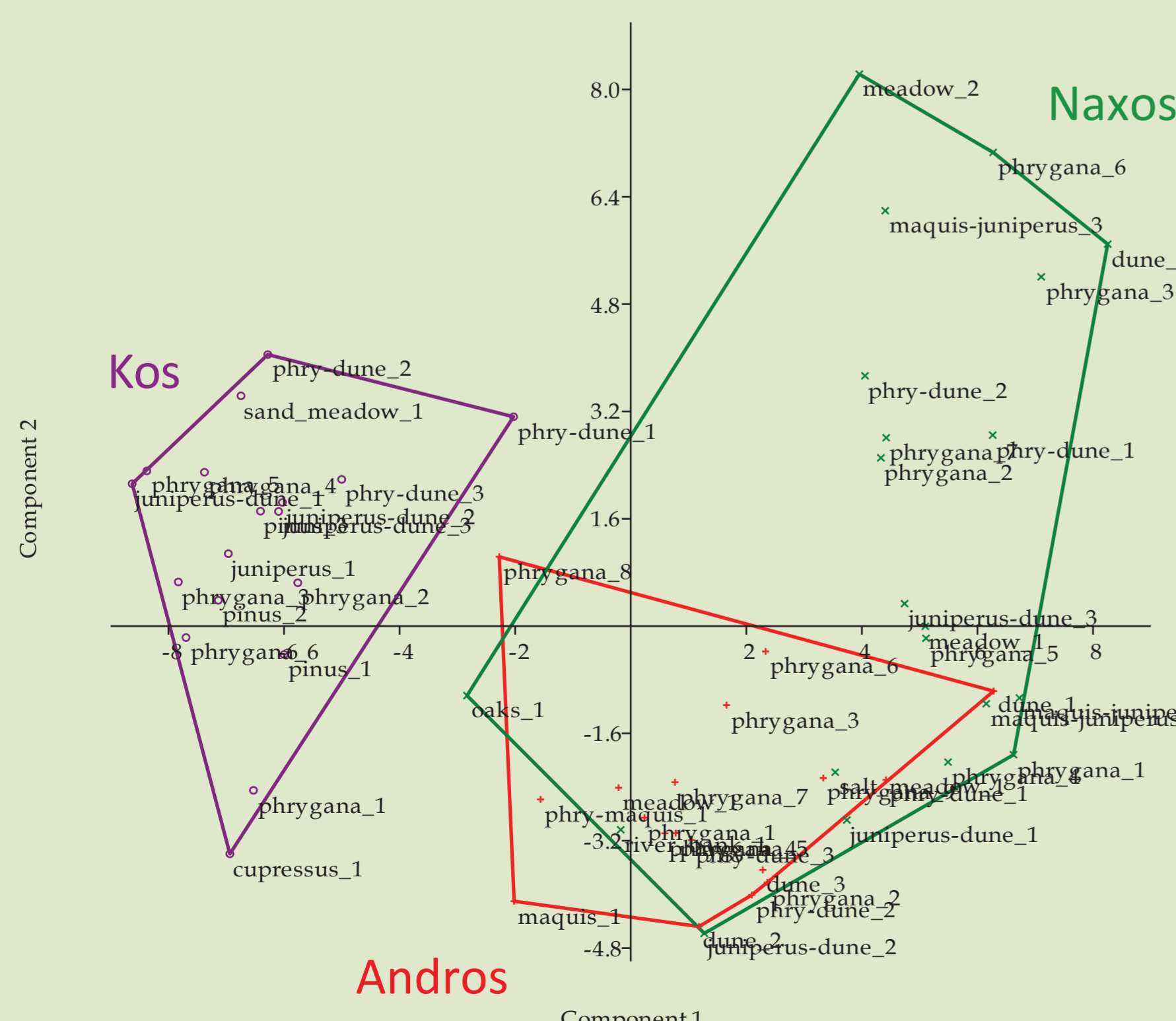
Discussion

Andros and Naxos seem to host similar myrmecofauna and both have dissimilar composition with Kos. These first results are a strong indication of the hypothesis' confirmation: ant assemblages on the eastern Aegean islands form distinct compositions from the western ones.

Further studies are required in order to establish the hypothesis: specimens' identification to species level is scheduled for the immediate future as well as inclusion of data from both the south-eastern coastal part of Attica, Greece and the coast of Asia Minor, Turkey.

Currently the β -diversity is under analysis in relation to abiotic factors. Various parameters such as climatic and land-use data are examined, in order to identify the drivers causing same habitat types hosting different composition of genera. In case anthropogenic disturbance is found to be modifying the underlying distributional pattern, scenarios and suggestions for conservation management will be proposed.

The figure on the left shows the result of the Principal Component Analysis (PCA) of the genera's cumulative presence across time. The convex hulls group the habitats of each island: Andros in red, Naxos in green, Kos in purple. The overlapping of Andros' and Naxos' convex hulls suggests a degree of similarity in the islands' composition of genera. Kos' composition of genera appears to be distinct.



Selected Literature

1. Fattorini S. 2002. Biogeography of the tenebrionid beetles (Coleoptera, Tenebrionidae) on the Aegean Islands (Greece). *Journal of Biogeography*, 29: 49-67.
2. Sfenhourakis S. 1996. A biogeographical analysis of terrestrial isopods (Isopoda, Oniscidea) from the central Aegean islands (Greece). *Journal of Biogeography* 23:687-698.



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