

shows clearly enough a pattern of this type.

There is evidence that substantial areas of the Norwegian coast constituted ice free refuges during the Pleistocene glaciations on which several species of plants and animals should have survived (PETERSEN 1947; LINDROTH 1953). However these same regions are still today under the beneficial influence of the Gulf stream, yet none of the studied ants shows a preferential distribution there. Although a relatively high species concentration in Northeast Norway comes out clearly in both the Q and R analysis this is more likely to be an expansion of the richer eastern continental fauna into a relatively favourable area than a relict fauna of Pleistocene origin and no similar pattern is present on the more beneficially exposed west coast. Although it is possible to suppose that the most typically north boreal elements included in our analyses (Distribution type I, Figure 62) could have survived in ice free refugia, there is not enough evidence to prefer this hypothesis to the simpler explanation of a post Pleistocene colonisation from the south.

It should be mentioned here that ant zoogeography has some peculiarities in that the biological unit is not the individual but the colony which is relatively non motile in space and usually restricted to a well defined foraging territory (BRIAN 1965). On the other hand ant dispersal capacity though differing for different species may be relatively great at the time of the nuptial flight and over periods of hundreds of years most species would have a potential to colonise all available free spaces within a region. However, competition, including defence of a territory for food exploitation (DLUSSKY 1965) and predation of mated females, would favour the first colonisers of a given area. Such species would play a dominant role through North Europe where the annual

period of activity and food resources are relatively limited.

We have already suggested that the peculiarities of the ant fauna of Öland and Gotland where climate or other features do not contrast sharply with their nearest continental lands, can be explained by interspecific competition favouring the first chance arrivals on a limited insular surface; a similar explanation may apply to the presence of *F. rufibarbis* on the Scilly Isles contrasting with its total absence from the nearest British mainland where the similar *F. cucicularia* is abundant. The pre-existence of any one number of a species group of a dominant genus such as *Formica* would be prejudicial for the settlement of another member of the same species group.

Moreover the presence of a given species in a given locality clearly implies the existence of contemporary appropriate environmental conditions independently of the origin of that species. There is evidence that the ant geographical picture for the more observable species of the *F. rufa* group is continuously changing in response to man made environmental changes (HUGHES 1975; BREEN 1976). At the same time in the British Isles the more local species appear to have been rather stable over the past 100 years in relatively unaltered biotopes (COLLINGWOOD 1971). The results of our regressions demonstrate the important role played by environmental factors such as sunshine and summer temperature and despite the limitations of the large generalisations on homogeneity within our area units we have been forced to make, this study can be regarded as a first rough approach to evidenciate and explain phenomena of this type. Considering the known continuous variation of environmental factors in time, there seems to be little need to search for explanations for the present day ant population in North Europe beyond a few thousand years.