

Ranking

The rank of the five groups can be considered for each of the twelve variables and the degree of agreement or concordance measured (Table 5). (Ranking must be reversed for the set of five variables that correlate negatively with height and give negative coefficients for the first principle component.) *Lasius alienus* comes first in seven and second in four cases and only ranks lower in the *Calluna vulgaris* sequence. *Lasius niger* by contrast ranks last in seven and fourth in five cases. If the ranks are summed the sequence: *L. alienus*, *Tetramorium caespitum*, no-ants, *Formica fusca* and *Lasius niger* is obtained and the coefficient of concordance (W) has the value 0.51 ($P < 0.001$) so that there is considerable 'agreement' between variable rankings (Moroney 1956).

Principle components

Each species of ant and no-ants has a position in the model space defined by the three components. The species value for each of these is calculated by summing the products of the means and the appropriate standardized coefficients.

Table 6. Species loadings on the first three principle components and their distances apart in the three dimensional space

Species	Component			Distances			
	I	II	III	<i>Lasius alienus</i>	<i>Tetramorium caespitum</i>	No-ants	<i>Formica fusca</i>
<i>L. alienus</i>	13.19	-5.03	4.61	-	-	-	-
<i>T. caespitum</i>	12.41	-4.09	5.90	1.77	-	-	-
No-ants	11.88	-1.08	3.62	4.28	3.81	-	-
<i>F. fusca</i>	10.18	-3.03	8.73	5.48	3.76	5.73	-
<i>L. niger</i>	6.91	-4.75	4.28	6.29	5.77	5.85	5.78
Mean	10.91	-3.60	5.43				

In relation to the first component the species values should form a sequence similar to the over-all rank (Kendall 1957). This is indeed the case (Table 6): *L. alienus*, *Tetramorium caespitum* and no-ants form a close association at intervals of less than 1 unit; *Formica fusca* stands 1.7 units from the nearest (no-ants) and *Lasius niger*, 5 units, the distance between them being 3.3 (see Fig. 2). Thus the wetness of the *L. niger* habitat is represented in this model by its separation from the other ants in relation to the first (water) component.

The second component produces a totally different arrangement. 'No-ants' stands 2 units away from the nearest (*Formica fusca*). This is about 1 unit from *Tetramorium caespitum* which is less than 1 unit from the extremely close *Lasius* species. The implication is that ants do not occur in areas poor in plant nutrients (it will be recalled that half the area is bare and half the vegetation is *Calluna vulgaris* whilst *Ulex minor* is unusually infrequent), but that the two *Lasius* species though highly dissimilar in relation to water supply both live in nutrient-rich ecosystems.

The third shows *Formica fusca* well above average and the two *Lasius* species (again together) and 'no-ants' below average. If this component represents wind exposure it is not surprising to find *Formica fusca* which is the only completely above-ground hunter, living in sheltered places. The position of *Lasius niger* close to *L. alienus* may be taken to indicate that it is low living because of the moisture and its associated vegetation rather than the shelter (it tends Coccidae on *Molinia caerulea*).