



Fig. 3. Geographical distributions of samples workers of *Plectroctena mandibularis* (+) and *P. conjugata* (X).

those concerning the analysis of workers. FI and MI were significantly but weakly correlated with the first and second axes respectively ($r_{FI} = 0.65$; $r_{MI} = -0.51$), implying that they are poor indices of general morphology. For these reasons, no distinguishing features were identified.

Samples of queens were collected from most of southeastern Africa (Fig. 5). Canonical correlation analysis found no significant sets of axes relating morphology to distribution ($\Lambda_1 = 0.13$; $\Lambda_2 = 0.47$; $P > 0.10$ for both sets of axes).

Morphometric variation: males

A plot of the first two axes of a principal component analysis of the morphological measurements of 40 males showed only one spheroidal cluster, with the two taxa thoroughly mixed. The first axis had an eigenvalue of 2.9, accounting for 36.2 % of the variation. It was not uniformly or strongly correlated with the original variables. Abdominal pigmentation and clypeus width dominated the second axis with absolute weightings of 0.51, but did not correlate strongly with the associated component scores.

Males were sampled from across their southern African range (Fig. 6). Only the first axes of a

canonical correlation analysis of their morphology and coloration with geographical location was significant (Table 4). The first axes emphasized latitude and gaster coloration, with very small loadings of mixed sign for the other variables (Table 4), so that only a strong latitudinal trend in gaster colour was revealed. Such trends are not rare *within* species of southern African wasps and bees (Steele *et al.* 1998; C.D. Eardley 1983, pers. comm.; F.W. Gess, pers. comm.), which suggests a common underlying environmental effect.

TAXONOMIC CONCLUSION

Intranidal morphological variation contradicts the traditional means of distinguishing *P. mandibularis* from *P. conjugata*, since representatives of both taxa may occur in the same nest. This conclusion is supported by the lack of categorical distinction between them in the principal component analysis of males. Only in the workers and queens was there a degree of differentiation between the taxa, and this is attributable to body size and its effect on allometric variation. There was also no coherent geographical differentiation of the taxa besides latitudinal variation in the gaster colour of males. No categorical variation in the structure of