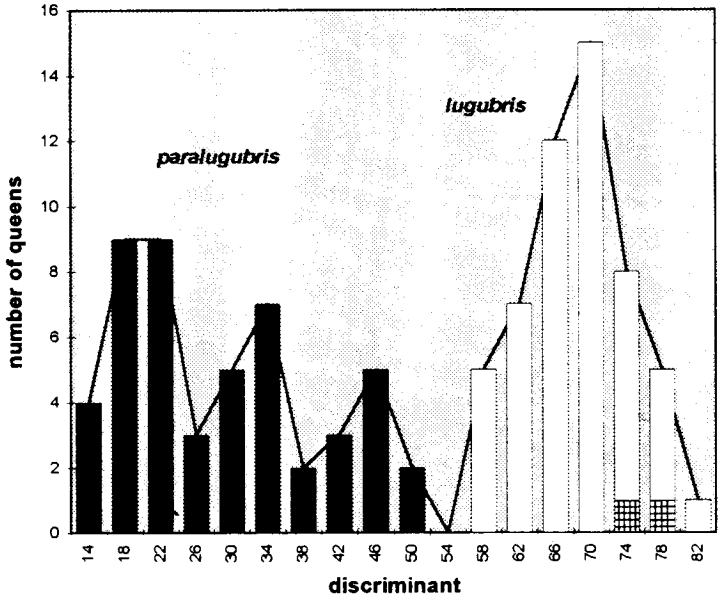

Fig. 3. Frequency distribution of the discriminant $D_{L/P}$ of individual queens of *Formica paralugubris* nov. spec. and *F. lugubris*. The cross-hatched squares within the *F. lugubris* sample represent the type queens of *Formica rufa* var. *nylanderi* BONDROIT, 1919.

More powerful and more robust is a multiple discriminant function using 4 characters:

$$D_{L.P} = 0.53\ mPNHL_{cor} + 0.32\ METHL_{cor} + 0.20\ nMET_{cor} - 0.04\ nSC_{cor}$$

This function thus far offered a perfect separation of all studied samples (Fig. 2). In view of the very few N European and British samples studied, it remains open if this function will be applicable to the *lugubris* population from these regions.

The queens of *paralugubris* and *lugubris* are most clearly separable by METHL, MESHL and nPE (Tab. 3). 36% of the *lugubris* queens have a bigger CW than the largest *paralugubris* queens. A multiple discriminant function:

$$D_{L.P} = 0.109\ METHL + 0.072\ MESHL + 0.586\ nPE + 0.001\,1\ CW$$

separated all studied queens (Fig. 3).

3.2. The coincidence of external morphology with genetic and behavioural features

In the material from the Swiss Jura, there is a coincidence of the morphometric determination by means of $D_{L.P}$ with the results of either genetic typing or pupae carrying tests (PAMILO et al., 1992; ROSENGREN et al., 1994; unpublished results of M. CHAPUISAT/Lausanne). All 11 nest samples of workers definitely allocated to type B (the nest samples D, G1–G5, G34, G82, R1, R3, R16) had $D_{L.P}$ of 0.74–0.92, which is a clear indication for *Formica paralugubris*. All 8 nest samples definitely allocated to type A (the nest samples G20, G29, G61, G68, GR9, GR12, GR18, GR25) had a $D_{L.P}$ of 1.05–1.27 which is a clear indication for *Formica lugubris*. Another two samples typed by the Lausanne investigators as 'probably type A' (G73 and G29) are clear *Formica lugubris* according to their $D_{L.P}$ of 1.13 and 1.34.