Tab. 3: Morphometric data of individual queens of *F. lugubris*, *paralugubris*, and *aquilonia*. Given are the arithmetric mean, the standard deviation, and the extreme values. The discriminant $D_{L/P}$ with $D_{L/P}$ = 0.109 METHL + 0.072 MESHL + 0.586 nPE + 0.0011 CW offers a perfect separation of *F. lugubris* and *paralugubris*.

| | *Formica lugubris* (n=53) | | *Formica paralugubris* (n=49) | | *Formica aquilonia* (n=13) | |
|---|---|---|---|---|---|---|
| | mean ±SD | [min,max] | mean ±SD | [min,max] | mean ±SD | [min,max] |
| CL | 2216 ±84 | [1946,2396] | 2113 ±54 | [2006,2268] | 2054 ±47 | [1974,2123] |
| CW | 2212 ±77 | [2013,2411] | 2085 ±58 | [1978,2245] | 2003 ±62 | [1872,2098] |
| CL/CW | 1.002 ±0.022 | [0.953,1.051] | 1.014 ±0.022 | [0.973,1.077] | 1.026 ±0.022 | [0.992,1.068] |
| SL/CL | 0.785 ±0.016 | [0.748,0.822] | 0.800 ±0.021 | [0.761,0.840] | 0.799 ±0.029 | [0.749,0.868] |
| PNHL | 248.6 ±51.6 | [124,330] | 86.6 ±49.1 | [33,258] | 37.1 ±18.4 | [0,66] |
| nPE | 19.0 ±4.1 | [9.5,28] | 8.6 ±3.4 | [3,17] | 3.9 ±3.8 | [0,14] |
| METHL | 306.8 ±35.3 | [217,375] | 107.6 ±54.4 | [32,214] | 35.8 ±31.1 | [0,108] |
| MESHL | 298.9 ±31.9 | [254,384] | 137.8 ±64.2 | [47,266] | 71.1 ±44.1 | [0,156] |
| nOCC | 24.9 ±6.1 | [14,38] | 23.6 ±6.0 | [9.5,39] | 3.04 ±2.93 | [0,8] |
| $D_{L/P}$ | 68.5 ±5.9 | [56.4,83.6] | 29.0 ±10.9 | [14.3,51.4] | | |

More difficult is the distinction of *paralugubris* and *lugubris*, although the statistical difference of all but 2 characters shown in the tables 1–3 is highly significant for $p < 0.0001$. The exceptions are the characters nOCC and CL/CW which are statistically equal in both species. The only character without overlap in the workers is the nest sample mean of mPNHLcor. The most simple application of mPNHL for the species' separation is given in a linear regression:

$$\text{mPNHL} = 0.02477\ \text{CL} + 43.2$$

The mPNHL values of *lugubris* are bigger and those of *paralugubris* smaller than the values indicated by this regression line.

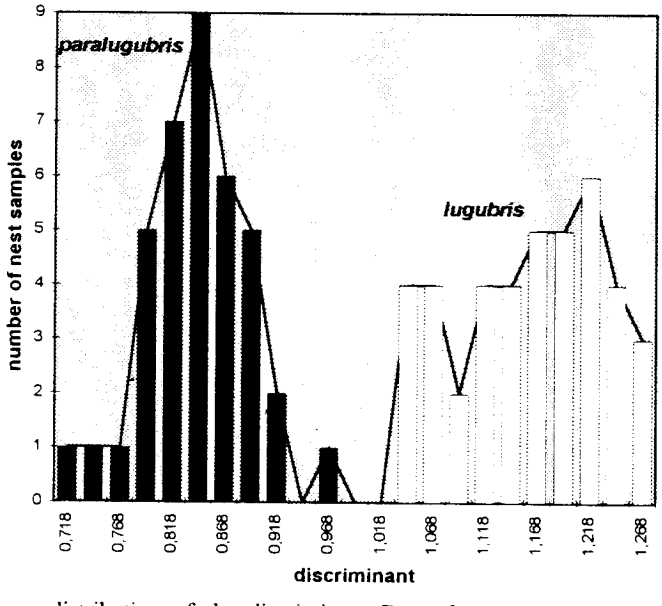


Fig. 2: Frequency distribution of the discriminant $D_{L/P}$ of nest sample means in workers of *Formica paralugubris* nov. spec. and *F. lugubris*.