

to a unidirectional MANN-WHITNEY test (U test), the SD_{pn} of **pht P** are significantly smaller than in **pht I** for $\alpha = 0.025$ while the SD_{pp} are significantly smaller for $\alpha = 0.005$. This is evidence that monogyneous **pht I** nests have a higher intranidal variability than **pht R** nests of equal colony status. A similar test for **pht P**, **pht I** is impossible because of the lack of comparable monogyneous **pht P** samples.

The above interpretation of character correlations and intranidal variability is surely somewhat speculative but a much better argument for possible hybrid origin of **pht I** provide the positions of mean values of all pilosity characters studied (see Table 1). In hair length data as well as in square-root-transformed pilosity numbers, the mean of each character of **pht I** is almost exactly equal to the median position between the means of the putative parent entities **pht P** and **pht R**. The correlation between the 8 **pht I** means and these median positions is $r = 0.9999$ which is intriguing.

3.4. Intranidal phenotype mixtures, phenotype shifts and eventual linkage of the phenotypes

It is difficult to estimate the ratio of nests containing a phenotype mixture because the within-phenotype variability is considerable even in nests with regular pilosity distributions which are not suspected to contain mixtures. Data from such normal nests are summarized in the following table.

H interval	[0.0, 14.5]	[14.5, 25.0]	[25.0, 65.0]
pht P (614 workers from 62 nests)	80.7 %	18.0 %	1.3 %
pht I (847 workers from 67 nests)	25.0 %	55.6 %	19.4 %
pht R (360 workers from 42 nests)	0.8 %	13.1 %	86.1 %

Considering the summed intranidal standard deviation of pilosity numbers $SD_6 = SD_{ih} + SD_{lh} + SD_{pn} + SD_{mn} + SD_{pp} + SD_{pr}$, we have 430 samples with $SD_6 \leq 26.6$. From these samples it is difficult to sort out undoubtedly mixed nests. However, two another nest samples which data were not incorporated into Figs. 1–12, Tables 1–2 and other comparative statistics showed a very clear phenotype mixture: nest No 43 with $SD_6 = 32.9$ and a mean hair sum $S_6 = 44.9$ and sample and nest No 454 with $SD_6 = 45.3$ and $S_6 = 66.3$. Nest No 43 was a small oligogyneous colony at the site Liebsteiner Berg near Görlitz and contained in 1984 workers from nearly bare **pht P** (hair sum = 8) to extremely hairy **pht R** workers (hair sum up to 116). In the same year I removed two functional queens from this nest; one of these showed characters suggesting a **pht R** or **pht I** queen and the second had characters of a **pht R** queen. Two years later the nest was still in a good condition or even a little more populous but the extremely hairy worker fraction (offspring of the one removed hairy **pht R** queen?) had disappeared and SD_6 had fallen to a normal value of 19.8.

The site Liebsteiner Berg is a small woodland of 8 ha in which I found as much as 24 **pht I** nests (20 **IP** (= polyneous) + 4 **Im** (= monogyneous) nests) and 10 **pht R** nests (4 **RP** + 6 **Rm** nests). This very close spatial neighbourhood means a high frequency of possible between-phenotype encounters. In case of nest No 43, a plausible interpretation seems to me that it was originally a 'pure' **IP** nest which had accepted a **pht R** queen. I had the impression that, at this site, the **IP** nests contained more frequently a small fraction of **pht R** workers than observed for **IP** nests in other sites with less close contacts of both phenotypes. The acceptance behaviour of **IP** nests to freshly dealate queens was observed here several times. As a rule, queens of own phenotype (from alien or own nest) as well as **pht R** queens were attacked and the majority was obviously killed but these attacks were sometimes less vehement or lacking. Nests producing both males and queens were not very rare in **pht IP** and intranidal mating is probably no exception in such nests. Even in nests not producing queens, the males showed intensive mating behaviour already on mound surface, mounting workers or individuals of own sex. If **IP** males performed a nuptial flight, it seemed, for most individuals, short-ranged and not directed to very distant targets, in so far as tracking of flight movements was possible in this woodland.

Few observations of **Rm** nests confirm the conventional thesis that any dealate queen is killed by fierce attack. However, such a schedule cannot be an invariable trait of all