hibit a significantly parallel course. However, in these urodeles a greater extension in the range of Cs/Cv values is found. On the other hand, paedogenetic urodeles display broad nuclear DNA variations associated with changes, however small, in the relative cell surface area (whose values lie around the minimal Cs/Cv values attained by the other urodeles). Hence, the slope of the regression line of these values *c* is much steeper than in the other 2 amphibian groups (figure 2).

Other investigators[8], though confirming the general hypothesis of a correlation between cell size and the rate of respiratory metabolism, have seen that in some amphibian species the erythrocytes (studied in vivo) tend to retain the same relative surface area despite their different sizes: according to these workers, this fact would depend upon the decrease in erythrocyte thickness as the cell volume increases. In the blood smears under study here, erythrocyte thickness increases according to the cell volume, whereby, as stated earlier, larger erythrocytes tend to decrease in their relative surface area in both the anurans and urodeles. In these cells, too, as in those of some tissues from various amphibian species, a reverse correlation between cell size and metabolic rate, as reported by several workers[9], seems to be valid.

In the anurans and nonpaedogenetic urodeles, therefore, the correlation between the genome size and cell size seems to be controled by rather similar mechanisms, suggesting that such mechanisms may also be operative in the majority of vertebrates, possessing DNA amounts comparable to those typical of the anurans. Despite their hypertrophic genomes, paedogenetic urodeles (and possibly the dipnoans) succeed in retaining Cs/Cv ratios which do not diverge from the minimal ones in other amphibians by virtue of a lowered increase in both Cs and Cv versus DNA and Nv (table 2). The possible metabolic significance of these phenomena has already been discussed[4,6].

The conclusion may be drawn that the amphibians seem to avail themselves of the adaptive opportunities offered by genome and cell size variations to a greater extent than other vertebrates. This is perhaps related to the poor efficiency, in the amphibia, of the systems of internal homeostasis, which conversely make other vertebrates (especially terrestrial ones) more independent of changes in various environmental conditions[10]. Qualitatively, the interspecific differences in cellular and nuclear sizes in the amphibians seem to concern chiefly the more repetitive (nongenic) DNA fractions[4,11]. Besides affecting the cell metabolic rate, these differences appear to be correlated with the length of the S phase (DNA autosynthesis)[12], the duration of embryonic and larval developments[3] and perhaps with other physiological characters of high adaptive significance for the amphibians[10].

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Chemical mediators in the oviposition behaviour of the house longhorn beetle, *Hylotrupes bajulus*

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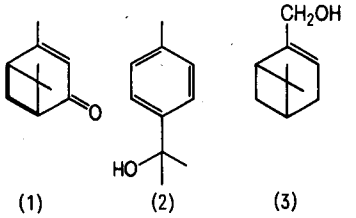
Summary. Oviposition behaviour in the timber pest *Hylotrupes bajulus* is mediated by pheromones ((–)-verbenone and p-cymen-8-ol) produced in the frass of the wood-boring larvae of the species.

In our studies of the role of chemosensory substances in the behaviour of the house longhorn beetle *Hylotrupes bajulus* (Coleoptera, Cerambycidae)[2], a serious pest of coniferous softwoods, we observed that mated females showed a preference for oviposition on actively-infested wood rather than on uninfested material. In this context, *H. bajulus* cultures were established artifically on blocks of untreated *Pinus sylvestis* pine wood obtained from a single source. Newly-hatched larvae were introduced into blocks of wood impregnated with yeast extract[3], and after 6 months development were transferred to untreated blocks for at least 3 months. Cold-treatment of these blocks for approximately 4 weeks at 5 °C results after pupation in the emergence of adult beetles some 5–7 weeks later. Within several minutes of emergence, the male becomes attracted to the female and after location and copulation, the mated female immediately seeks suitable sites for egg-laying. At close range, tactile stimuli predominate and the female probes the wood surface until a suitable fissure is located. However, the possibility of the involvement of chemical stimuli in oviposition was suggested by the observation that egg-laying on infested culture blocks was preferred to sound pine wood. In order to investigate the precise chemical effects in operation, we extracted the frass (predominantly fecal pellets) produced by the tunnelling of the larvae and fractionated the extract in conjunction with an electrophysiological bioassay using electroantennography (EAG)[4]. Microscale analysis of the fraction which produced the major EAG response allowed identification of several monooxygenated monoterpenes, the most abundant of which were (–)-verbenone (**1**), p-cymen-8-ol (**2**) and myrtenol)**3**)[2]. We present here the results of testing the importance in oviposition behaviour of **1** and **2**, both of which were individually EAG-active, and also report preliminary data for the testing of **3**[5].



(1) (–)-verbenone (2) p-cymen-8-ol (3) Myrtenol

A simple choice test was devised which compared host-wood attraction with that of a sample plus host-wood by observation of the number of eggs laid in each case. The method[6] involved placing 2 groups of 5 blocks ($15 \times 5 \times 2$ cm) a distance of 20 cm apart in a glass bioassay tank (30 cm $\times$ 30 cm $\times$ 60 cm fitted with a glass top), 1 group of which acted as a control. The blocks in each group were separated by spacers to produce a 0.4 mm gap and held together by 2 elastic bands. All bioassays were conducted in a room held at 70% relative humidity and 27 °C, the temperature having been observed to be critical for this bioassay. Chemical samples (5 µl pure substance) were introduced to 1 group of blocks by continuous diffusion from a glass capillary tube (1.4 mm i.d., sealed at one end). This technique is known to produce a constant rate of volatilization after an initial high rate of diffusion[7]. Wood blocks were of a single origin and the block surfaces were smoothed with glass paper in order to minimize tactile stimuli. Each bioassay test was run simultaneously as one of a group of 4 with the position of sample and blank blocks being changed alternately to eliminate the effects of external factors such as uneven lighting. Because the number of eggs laid by an individual female is subject to uncontrollable variation, it was decided to employ a nonparametric Wilcoxon matched-pairs sign-ranked test. 4 sets of experiments were conducted: a) p-cymen-8-ol against control, b) (−)-verbenone against control, c) (−)-verbenone + p-cymen-8-ol (1:1) [this being the approximate ratio of co-occurrence in frass] against (−)-verbenone and d) (−)-myrtenol against control. 10 replicates were run in each test (8 in d) using 2 unmated males and 2 unmated females. The results of these tests clearly indicate that (−)-verbenone is an oviposition stimulant with respect to the host wood ($N = 10, T = 1, p < 0.005$), whereas p-cymen-8-ol ($N = 10$, $T = 28$, $p > 0.05$) and (−)-myrtenol[8] ($N = 8$, $T = 21$, $p > 0.05$) have no activity alone. However, the activity of (−)-verbenone is synergized by the presence of p-cymen-8-ol, as evidenced by experiment c ($N = 10$, $T = 0$, $p < 0.005$).

In earlier studies, Becker reported that whereas a number of monoterpenoid hydrocarbons have a stimulating effect on oviposition in *H. bajulus*, oxygenated monoterpenes in general were either neutral or repellent. The apparent discrepancy between Becker's work and our own is probably explained by concentration effects since the amounts of test compounds employed in the former study were very much larger than those used here[6]. Indeed, we found in our preliminary studies that high concentrations of (−)-verbenone resulted in an oviposition preference for untreated control blocks, suggesting a repellent effect in such cases. Further bioassay studies are in progress which include tests of the role of other monooxygenated monoterpenes, and also the discrimination between attraction and stimulation with respect to oviposition.

1 Acknowledgment. We thank the S. R. C. for a studentship (MDH) and N. E. R. C. for research support and technical assistance.
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DNA sequence relatedness of some *Neurospora* isolates

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Summary. DNAs from several isolates of *Neurospora* were characterized by thermal denaturation and DNA-DNA hybridization. All the DNAs were found to have 3 components. Based on the percentage of DNA hybridization and the degree of base pair complementation with reference DNAs it has been possible to assign some of the isolates to the known species groups.

Quantitative data on genetic relatedness have been successfully obtained through the use of heterologous duplex formation in vitro, thereby, comparing a large number of shared genes[2–6]. The midpoint temperature of dissociation (Te) of hybrid duplexes is used as a criterion of the degree of complementation of DNA-strands from 2 different sources[2–6]. Homologous hybrids are assumed to be perfectly matched[7]. Thus, difference in the Te (ΔTe) of homologous and heterologous hybrids gives an estimation of the DNA-sequence divergence between the 2 species[8]. For the purpose of establishing a phylogenetic tree of different known species or to assign an unknown isolate to an authentic species group, reciprocal DNA-DNA hybridization in all combinations should be employed[9]. In a previous attempt[4], however, using 2 reference species the DNA-sequence divergence among some authentic species of *Neurospora* was estimated and their positions on a phylogenetic tree were depicted. *Neurospora* isolates collected from nature have been analyzed for their taxonomic status based on the crossing behavior[10]. This communication, based on

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