resistant to UV-light than to X-rays, the percentage survival being greater in the former. SAVAGE[2] has also observed that the X-rays have more mutagenic effect than UV-light.

The yield of the antifungal substance by the mutants has changed due to irradiation. KELNER[7] has obtained an antibiotic producing mutant of *S. griseus* from a non-antibiotic producing culture. SAVAGE[2], DULANEY et al.[3], DULANEY[4] have obtained mutants of *S. griseus* through irradiation which gave higher yield of streptomycin than the original culture. It is likely that irradiation may effect the yield of the active substance in both ways, as is evident from the present investigation.

Table II. Production of the antifungal substance by the 2 mutants of *S. nigrifaciens* as well as the parent culture as assayed in terms of inhibition of spore germination of *Colletotrichum capsici*

Replicate No.	Parent culture	Asporogenous mutant	Pigmented mutant
1	98.05	4.05	100.00
2	98.28	3.21	100.00
3	98.26	3.26	100.00
4	97.84	4.05	100.00
Mean	98.13	3.75	100.00

Mean of 50 observations.

Résumé. Changement de capacité de production antibiotique chez mutants nouveaux de *Streptomyces nigrifaciens.*

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Testing of LSD-25 and Related Compounds for Possible Effects on Egg-Laying Capacity and Egg-To-Adult Viability in *Drosophila*

The controversial nature of the available information on the effects of lysergic acid diethylamide on somatic chromosomes[1-6], meiotic chromosomes[7-8], developing embryos[9-15] and directly on the genetic material[16-20] has prompted us to undertake experimentation in which lysergic acid diethylamide (LSD-25), Bromolysergic acid diethylamide (BOL), and D-lysergic acid, were tested for possible genetic and/or developmental effects.

Each experiment performed was designed as follows: third instar *Drosophila pseudoobscura* female larvae were injected with 0.4 µl of a 10 µg/ml solution of the compound under consideration in phosphate buffered (pH = 7.4) physiological saline. Female larvae, chosen at random from the same cultures as the ones above, were injected with 0.4 µl of phosphate buffered physiological saline and were used as controls. The injection apparatus was that described by STOCKER[21] and it involved the use of a 10 µl Hamilton microsyringe connected to a glass needle through plastic tubing. The injected larvae were placed in culture bottles and were allowed to complete their development to adults. These adult females were aged for a 3 day period and they were then crossed individually to males of the same age in plastic bottles containing charcoal blackened (to facilitate egg counts) *Drosophila* medium. Each pair was transferred to new medium every 24 h (for 10 consecutive days) and the eggs deposited were counted and were allowed to hatch. The adults produced from these eggs were counted and sexed to determine possible egg-to-adult viability differences, and/or sex-ratio disturbances.

The Table shows a summary of the data obtained from the above described experimentation. Statistical analysis of the data, using a Dunnett's[22] multiple comparison test showed the following: 1. Egg-laying capacity. a) Controls vs. LSD-25 – no significant difference; b) controls vs. BOL – significant with a probability value $P < 0.05$; c) controls vs. lysergic acid – significant with a probability value at $P \ll 0.01$. 2. Egg-to-adult viability: a) Controls vs. LSD-25 – no significant difference; b) controls vs. BOL – significant with a probability value at $P \ll 0.01$; c) controls vs. lysergic acid – no significant difference. 3. Sex ratio: no significant differences between controls and any of the other groups.

It has been suggested in many of the cited publications that exposure to LSD-25 may result in offspring wastage. Our data show no such effects for this drug. The reports

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Summary of data on egg-laying capacity, egg-to-adult viability and sex-ratios of *Drosophila pseudoobscura* injected with 0.4 µl of a 10 µg/ml of a buffered-saline solution of LSD-25, BOL, or D-Lysergic acid

Treatment	Total No. of flies tested	Total No. of eggs laid	Range	Flies laying (%)						Average No. of eggs/fly	Adult ♂♂ emerging	Adult ♀♀ emerging	Not emerging (%)
				0–99 eggs	100–199 eggs	200–299 eggs	300–399 eggs	400–499 eggs	500–599 eggs				
Saline	55	16,820	69–548	3.6	21.8	25.5	18.2	23.6	7.3	306	6,837	7,319	15.8
LSD-25	56	17,995	68–494	1.8	7.1	35.7	25.0	30.3	0.0	322	7,275	7,767	16.4
BOL	58	14,626	0–444	5.2	18.9	39.6	27.6	3.4	0.0	252	5,685	5,545	23.2
Lysergic acid	55	10,897	30–378	7.2	40.0	50.9	1.8	0.0	0.0	198	4,553	4,683	15.2

Data on buffered-saline injected controls are included.

which detected offspring wastages in *Drosophila*[17–19] have utilized doses much higher than those used in our experimentation. This may be one of the reasons for the difference in results. It must be remembered, however, that in every case (including our experiments) the doses administered to the animals were much higher per gram of body weight than those taken by human users. The last statement must not be taken as meaning that the drug should be considered safe to use. Nothing is known about its metabolic fate in *Drosophila*, and there is a considerable body of information from mammalian systems to cause concern.

Although our data do not show effects of LSD-25 they certainly show effects of the other 2 chemically related compounds. Attempting to make any kind of generalizations and derive definite conclusions from these results should, again, be considered premature. One can state only the obvious and this is that both D-lysergic acid and BOL influence the egg-laying capacity of our experimental animal; the latter compound also appears to exercise a significant influence on egg-to-adult viability among the offspring of the treated individuals. Here again, detailed metabolic studies are needed to determine what is the part of these molecules that creates these effects[23].

Résumé. On a injecté du LSD-25, de l'acide bromolysergique-diéthylamide et de l'acide D-lysergique à des *Drosophila pseudoobscura* au troisième stade larvaire. Le LSD-25 n'affecte ni leur capacité de ponte, lorsqu'elles sont adultes, ni la viabilité (rapport numérique adultes/œufs) de leur progéniture. En revanche, la capacité de ponte est réduite tant par l'acide lysergique que par l'acide bromolysergique-diéthylamide, et ce dernier altère en outre la viabilité.

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Ant Compound Eye: Size-Related Ommatidium Differences Within a Single Wood Ant Nest

The worker population of a red wood ant nest provides a unique opportunity for investigating the effects on behavior of naturally occurring quantitative differences in neural and sensory structures. A relationship has been isolated between the size of these workers and the efficiency with which they learn to navigate terrain while foraging for colony food[1]. It was found for workers from a nest of Swiss red wood ants (*Formica rufa*), that the larger the head and such structures as the corpora pedunculata of the brain (supraesophageal ganglion) and the compound eye, the more efficient the foraging behavior.

It is thought that workers from a single nest have similar genetics, and that worker size is a function of seasonal factors such as temperature and food supply during critical growth stages[2–4]. The population is continuously distributed in size, without distinct morphological subgroupings (castes), and adult size is not related to age. Workers at all size levels forage for food in the terrain surrounding a nest, navigating by means of sequences of visual, chemical and tactile information[5,6].

One mechanism by which size could influence navigation efficiency would be through increases in the number of component elements in the visual and other information processing systems. While it is known that the number of components in the compound eye and other sensory and neural structures is greater in larger species of ants and other insects than in smaller related species[7–9], we know of no data on such size differences within the worker population of a single ant nest.

The object of the present study was to determine whether such quantitative differences occur in the compound eye as size increases within the worker population of a nest of California red wood ants (*Formica integroides*). The species is similar in behavior and morphology to the Swiss ants used in the size-efficiency study. The subjects were 67 adult workers taken from collections made in late summer and fall from a single isolated nest, with the selection made to achieve a distribution over the size range.

Three measurements were taken on each ant from standard photographs made of head and eye preparations. These measurements were: 1. a planimetric measure of head surface area (Figure 1 A); 2. the length of the right compound eye (Figure 1 A); and 3. the number