compound synthesized by an alternative classical method. The material obtained by the Texas workers cannot be identical with natural rat scotophobin because it lacks biological activity in rats, while natural rat scotophobin affords such a response. As a result, the latest structure attributed to scotophobin is in error[42].

Zusammenfassung. Eine Synthese von Scotophobin mit klassischen Methoden ergab ein Produkt, das sich vom natürlichen Peptid hinsichtlich seiner biologischen, chromatographischen und physiologischen Eigenschaften unterschied. Es wird daraus gefolgert, dass die für das natürliche Produkt vorgeschlagene Strukturformel nicht korrekt ist.

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Reversal of Dominance in the Competition Between *Drosophila nasuta* and *Drosophila neonasuta*

Interspecific competition studies involving chromosomally polymorphic and monomorphic populations of *Drosophila nasuta* and *Drosophila neonasuta* have revealed that irrespective of the strains in competition, *D. nasuta* supplants *D. neonasuta*. Here in all instances the initial frequency of the two competing species was 1:1 (25:25)[1].

In an extention of these tests interspecific competition studies were made with the initial frequency as 1 *D. nasuta* : 4 *D. neonasuta* (10:40). Simultaneously the interspecific competition process with 1:1 ratio was also followed in these 2 species. Serial transfer technique of AYALA[2] was adopted to maintain the experimental populations; 4 replicates were made for each set of experiments. The entire experiment was conducted at 21°C. The females of these 2 species are morphologically indistinguishable. However, the males can be differentiated from one another. Males of *D. nasuta* have complete silvery frons while the males of *D. neonasuta* have silvery markings around the frontal orbits only. Therefore, at each census the number of males of each species and the total population size were recorded. The cultures were maintained until the elimination of any one of the competing species.

Figures 1 and 2 illustrate the dynamics of the interspecific competition of *D. nasuta* and *D. neonasuta* initiated with 1:1 and 1:4 frequencies respectively. *D. nasuta* eliminates *D. neonasuta* when the initial ratio was 1:1 but that itself faces extinction when the founder population was in the ratio of 1:4. The species performances as measured by their mean number of males and the average population size maintained during competition are presented in the Table. Persual of this Table indicates the reversal of dominance of the 2 contesting species in the 2 sets of experiments.

Here the outcome of the competition is determined by the initial frequencies of the competing species. The initial advantage gained by the higher frequency of the founder population has made *D. neonasuta* to outvie *D. nasuta*.

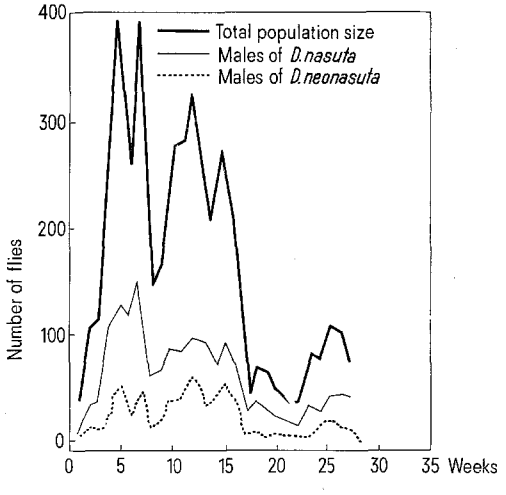

Fig. 1. Total population size and the number of males of *D. nasuta* and *D. neonasuta* during competition started with 1:1 frequency.

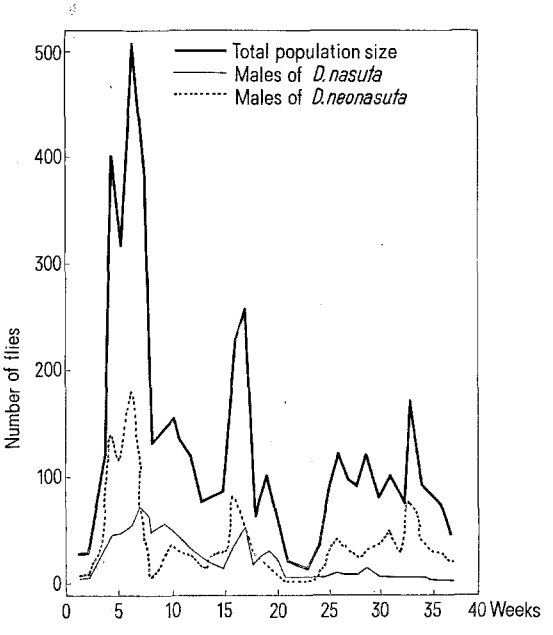

Fig. 2. Total population size and the number of males of *D. nasuta* and *D. neonasuta* during competition started with 1:4 frequency.

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[2] F. J. AYALA, Genetics *51*, 527 (1965).

Mean number of flies and standard error for the total number of males of *D. nasuta*, *D. neonasuta* and the total population size including the males and females of the 2 competing species

No.	Frequencies of founder population *D. nasuta* : *D. neonasuta*	Mean number of males of		Mean of the total population size including the males and females of *D. nasuta* and *D. neonasuta*
		D. nasuta	*D. neonasuta*	
	Experiment 1			
1	1:1	50.57 ± 6.93	14.09 ± 3.67	135.71 ± 18.17
2		54.75 ± 5.68	11.20 ± 2.13	140.29 ± 14.06
3		61.73 ± 7.18	23.57 ± 3.67	168.73 ± 22.49
4		44.42 ± 4.95	19.00 ± 3.14	137.07 ± 18.14
Average		52.86	16.96	145.45
	Experiment 2			
1	1:4	22.92 ± 5.80	36.48 ± 9.60	118.62 ± 29.89
2		17.00 ± 3.89	41.10 ± 7.42	119.13 ± 22.38
3		26.13 ± 3.88	39.36 ± 7.76	140.10 ± 22.02
4		33.29 ± 7.65	44.12 ± 9.98	152.41 ± 33.19
Average		24.83	40.26	132.56

In the light of this, the universality of frequency dependent selection and the natural selection favouring a sparse species ramains to be further investigated.

[3] The authors are deeply indebted to Dr. M. R. RAJASEKARASETTY, Professor and Head of the Department of Zoology, for his help and encouragement. This work is financially supported by Mysore University Research grants and C.S.I.R. New Delhi.

Zusammenfassung. In Mischpopulationen von Drosophila nasuta und D. neonasuta dominiert die erste Art, wenn das Anfangsverhältnis der Arten 1:1 beträgt. Beim Verähltnis 1:4 stirbt jedoch D. nasuta aus.

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Induction of Androgenetic Embryoids in the in vitro Cultured Anthers of Several Species

The importance of the in vitro culture of anthers in plant breeding and genetic research was stressed by several authors[1–4]. Up to date, pollen grains of a limited number of species when cultured in vitro are capable of growing directly into embryoids and eventually into plants, or of producing undifferentiated calluses which may in turn give rise to shoots and roots. This report is concerned with the successful development of androgenetic embryoids through culture of anthers of 7 species.

Anthers of the following species at the stage of uninucleate pollen grains in the given number were inoculated and cultured in vitro: *Helleborus foetidus*, 2900; *Paeonia lutea* v. *superba* and *P. suffruticosa*, 400; *Prunus avium*, 360; *Bromus inermis*, 2200; *Agropyron repens*, 350; *Festuca pratensis*, 1840; *Hordeum vulgare* (4 varieties: *Alsa, Damazy, Skrzeszowicki* and *Wiza*), 11600.

Flower buds of *Helleborus*, *Paeonia* and *Prunus* were sterilized in 70% ethanol for 30 sec, and later with chlorine water for 6–12 min. Flower spikes of species belonging to Gramineae were sterilized by chlorine water only, for 2–5 min. Material of all the species after sterilization was thoroughly washed with sterilized water. The basal media of MURASHIGE and SKOOG[5] and LINSMAIER and SKOOG[6] were used with an increase of sucrose concentration up to 12%. Growth supplements such as IAA, 2,4-D, BAP (benzylaminopurine) and casein hydrolysate were added to the media in various concentrations and combinations. The cultures were kept exposed to constant cool-white fluorescent illumination at temperature 22–25 °C and relative humidity of 70–80%. Squash preparations were made in order to determine the developmental stages of pollen grains. The whole inoculated material was cultured up to the 10th week, with the exception of anthers of *Hordeum*, *Bromus* and *Festuca* which are still kept in freshly prepared media.

After about 10 days of culture, anthers of *Paeonia* and *Helleborus* contained about 80% of 2-nuclei pollen grains. Some pollen grains were in a stage of nuclear division and after 14–21 days multinuclear and multicellular pollen grains were seen (Figures 5, 9, 10, 11). In *Paeonia*, after 6 weeks multicellular embryoids developed from 2–3% of pollen grains; however, they were still enclosed by exine. Microscopical observations revealed the presence of up to 30 cells in some embryoids. In *Helleborus* only about 1% of pollen developed into embryoids. It is worth noticing that, beside the presence of embryoids in anthers of *Paeonia* and *Helleborus*, many pollen grains were still fully developed possessing 1 or 2 nuclei situated in a densely stained cytoplasm. In *Prunus*, after 2 weeks of culture nearly all pollen degenerated, only few (about 0.1%) looked normal and possessed 1 or 2 nuclei. Pollen embryoids containing

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[6] E. M. LINSMAIER and F. SKOOG, Physiologia Pl. *18*, 100 (1965).