Consequently, no interdependency was observed between the losses of requirement for lysine and PABA. The same held for the reappearance of amino acid and PABA requirements. On a basic culture medium containing lysine but not PABA, rapidly-growing lysine-dependent sectors developed from transferred prototrophic colonies. Mycelia from these sectors became both lysine- and PABA-dependent after transfer onto media containing both compounds, and the original *A. nidulans* lys was recovered at this stage. The same result was obtained if the sequence of supplementing the vitamin-free culture medium was the reverse, with the exception that PABA-dependent sectors developed first. We assume that in these rare cases two chromosomes integrated from *A. fumigatus* into *A. nidulans*, and were then eliminated independently and rapidly when the selective pressure ceased.

The precondition of interspecific complementation in otherwise incompatible fungi may possibly be the disintegration of nuclei of one of the two species. Such a disintegration could be followed by the retention of one or a few chromosomes. This might be the reason for both the low frequency of complementation and our inability to recover both fusion partners simultaneously from a given colony.

Aneuploidy is a frequent consequence of interspecific fusion of animal cells[13,14]. Our results suggest that this might be valid on a broader scale in eukaryotes. Moreover, a directed and selective retention and propagation of foreign chromosomes might be achieved with fungi by using suitable mutants. This method may offer further possibilities in eukaryotic genetics.

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Crossing between nondiapausing and diapausing races of Sarcophaga peregrina

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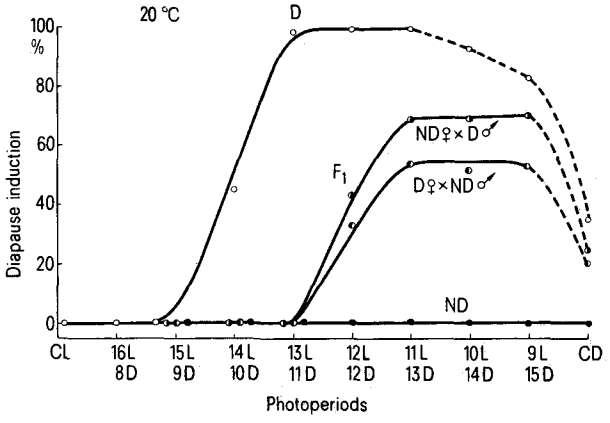
Summary. The temperate race (D) of *S. peregrina* undergoes pupal diapause in response to certain environmental conditions of photoperiod (13L:11D–11L:13D) and temperature (under 20 °C). The tropical race (ND) does not do so under the same circumstances. The tendency toward diapause was suppressed in 30–40% of the hybrids of crossings D♀ × ND♂ and ND♀ × D♂ even under such short day and low temperature conditions as 11L:13D–9L:15D, 20 °C. For entering diapause, the hybrids require a shorter day length (13L:11D) than that of (D) parents (15L:9D).

Sarcophaga peregrina Rob.-Desvoidy (Diptera: Sarcophagidae) is one of the synanthropic flesh flies which are commonly found in Japanese privies throughout Japan. Seven related species are distributed in and around the Indo-Australian area[2]. *S. peregrina* has the widest distribution, covering China, Japan, Volcano Is., Bonin Is., Mariana Is., Formosa, Hainan Is., India, Ceylon, Australia, New Guinea, New Britain, Samoa, Gilbert Is., and Hawaii. The northernmost boundary would appear to lie in Hokkaido[3]. This species is known to be a mechanical vector of aetiological agents of disease and its larvae are responsible for intestinal myiasis in these areas. Adults appear from May to September in Central Japan, and the facultatively diapausing pupa is known to be the overwintering form[4]. Under conditions of short day and low temperature, this flesh fly enters pupal diapause in Japan.



The induction of pupal diapause in Japanese diapause (D) and New Guinean nondiapause (ND) races of *Sarcophaga peregrina* and their hybrids (F_1) under different light regimes (at 20 °C). Each experiment was performed 3 times and the results averaged.

A New Guinean race whose colonies are derived from a single wild female collected in Wau (7.22 S, 146.40 E), alt. 1050–1250 m, Morobe District, in December 1973, was available for the present crossing experiment[5]. In a preliminary experiment it was found that the tropical race (ND) did not enter pupal diapause, even if parents and their offspring were bred under such light regimes and low temperature conditions as 14L:10D–12L:12D at 20 °C. A few of the offspring reared under the conditions: 20 °C, 11L:13D, however, developed into diapause pupae (2%). Nondiapausing colonies were selected and used for the crossing experiment. The 2 geographical races are morphologically distinguishable by the male genitalia, especially by the shape of the apical plate of aedeagus. Hybrid generations exhibited normal fertility of crossing. Eggs of each race are fertilized by sperms of the other, and at least some of the zygotes develop normally. Both

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races were reared and maintained routinely in our laboratory, as described in the previous paper[6]. Adults originating from nondiapausing pupae were used in each experiment in the case of the Japanese race (D). If parents were placed under a long day condition (15L:9D) at 20 °C, the offspring developed into only nondiapausing pupa regardless of the light regime in the following larval stages, in Japanese *peregrina*. Therefore, adults of both races were kept in a short day room (12L:12D, 20 °C) for the experiment. About 150 newly deposited larvae were transferred to a glass vessel (1.5 l in volume and 12 cm in diameter) in a room kept at 20 °C. Then each vessel was put into a 5-gallon can equipped with a 5-watt fluorescent lamp. Illumination of this lamp was controlled by an outside time switch. The inside temperature of each can was controlled at 20 °C by aerator. Photoperiods used were: continuous lighting, 16L:8D, 15L:9D, 14L:10D, 13L:11D, 12L:12D, 11L:13D, 10L:14D, 9L:15D and continuous darkness. The larvae reached their maximal sizes in 5 days at 20 °C. In order to synchronize pupation, fully grown larvae were left for an additional 4 days in the same vessels supplied daily with distilled water to keep the inside wet. The prepupal insects were allowed to pupate in sawdust in dry vessels (480 ml in volume and 8 cm in diameter) and kept for a further 2 weeks under the same conditions of photoperiod and temperature. At the end of this time, the number of diapause and nondiapause pupae were counted, using the method of judgement described by FRANKEL and HSIAO[7]. Nondiapause pupae at this stage of development were easily distinguished from those of diapause flies with their pigmented eyes.

When larvae of Japanese *peregrina* were reared at 20 °C under short day conditions 13L:11D to 10L:14D, pupal diapause approached 100%, as shown in the figure. Under a long day condition (15L:9D, 20 °C), they almost all did not enter diapause, as known from previous work[4]. None of the New Guinean *peregrina*, however, entered pupal diapause, irrespective of photoperiod, in any of the repeated experiments (figure, ND). The crossbreeding experiments (D♀ × ND♂; ND♀ × D♂) produced pupae of the offspring (F_1) which did not undergo diapause under long day conditions such as 15L:9D to 13L:11D. Under the light regime 12L:12D, 30% of the pupae entered diapause in the crossing D♀ × ND♂. The percentage of hybrid offspring diapausing increased up to 50% in D♀ × ND♂ and 66% in ND♀ × D♂ under the light regime 11L:13D. The figure shows that about 30–40% of hybrids did not enter diapause, even under the three short day lengths such as 11L:13D, 10L:14D and 9L:15D. In the reversed cross, ND♀ × D♂, the mean percentage of diapausing hybrids was apparently more than those of D♀ × ND♂ crossings, although there is no significant difference between them in the final analysis. Day length of less than 11 h seems to have been effective upon about 60% of the F_1. New Guinean and Japanese parents are considered to have anti-diapause and diapause factors respectively, which may be genetically transmitted to their progeny. Also, it is likely that there is another genetic factor which reflects the day length making the fly diapause. The Japanese race requires a critical day length of between 14 and 15 h for diapause. New Guinean flies may be considered to have a critical day length near to 11 h for entering diapause, as suggested by the fact that 2% of New Guinean flies diapaused under the 11L:13D light regime in the preliminary inbreeding experiment. The F_1 seems to require an intermediate day length (13L:11D) for entering diapause. The occurrence of anti-diapause allele(s) suppresses 30–40% of the latter allele(s) in F_1. Discovery of this kind of anti-diapause allele(s) may be applicable to the genetic control of Japanese *peregrina* which has to enter diapause under the severe climatic conditions of winter. VINOGRADOVA and ZINOVJEVA[8] reported that the diapause and nondiapause states of progeny are determined by a maternally operated photoperiod in *Calliphora vicina*, and suggested that the photoperiod regulates the physiological state of the larvae via the female, but does not influence the process of oögenesis directly in the larval diapause of the blow-fly. In the study on the embryonic diapause of field crickets, OHMACHI and MASAKI[9] found that the development of the hybrid egg is not determined by the yolk or cytoplasm provided by the mother, but the genetic constituents of the embryo or interaction between the two. Our experiment also suggests that the physiological state of the progeny is determined by the combination of allele(s) and environmental conditions.

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Oxygen consumption of the rat small intestine during infection with Nematospiroides dubius

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Summary. Qo_2 of jejunal rings did not differ significantly between uninfected rats and rats infected for 7 days with *Nematospiroides dubius*. Qo_2 of isolated jejunal mucosal epithelial cells was significantly greater 7 days after infection than in uninfected controls or at 29–36 days after infection.

Although the absorptive capacity of the small intestine of a number of host species is altered during gastrointestinal nematode infections[1–3] relatively little else is known of intestinal metabolism in these infections, although work with rats infected with *Nematospiroides dubius* indicated an increase in glucose utilization during infection[2]. The present work measures the oxygen consumption by the small intestine of rats infected with *N. dubius*, a nematode which causes pronounced intestinal malabsorption of nutrients in the rat[2,3].

Methods. Female Wistar rats, aged 2.5–3 months at slaughter were used. A single dose of 4000 infective larvae in 0.5 ml tap water was given orally. Control animals were given 0.5 ml tap water 7 days before use. Animals were starved 16 h before use. The small intestine was

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