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INHERITANCE OF GREYISH BROWN (*gb*) AND DARK (*da*) LARVAE, AUTOSOMAL RECESSIVE MUTANTS IN THE FILARIA VECTOR *CULEX QUINQUEFASCIATUS*

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LARVAL colour mutants have been reported in *Culex pipiens* complex[1–7]. However, to-date only a few morphological larval colour mutants are available in *Culex quinquefasciatus*, one of the members of *c. pipiens* complex. The present paper describes the mode of inheritance of two larval colour mutants, dark (*da*) and greyish brown (*gb*) larvae for *C. quinquefasciatus* one of the important vectors of Bancroftian filariasis in South East Asia.

Greyish brown larvae (*gb*): The mutant larvae are greyish brown in colour and the colour differences can easily be seen from second instar onwards. The colour, however, darkens in the later instars, particularly in the fourth instar. The colour persisted throughout the pupal stages and in the freshly emerged adults.

The mutant was isolated from Bangalore, Delhi, Poona and Kolar strains and maintained in two large population cages. This mutant has been designated as *gb*.

Dark larvae (*da*): The larvae are deep dark in colour, and can easily be distinguished even during the early instars (second instars). However, the colour darkens during the late larval instars and persist throughout the pupal stages and in the freshly emerged adults. This mutant, designated *da* was isolated from the Bangalore strain and maintained two large cages.

Single pair matings in *C. quinquefasciatus* have not occurred sufficiently often for regular use in genetic experiments. Mass matings were, therefore, made in all crosses. Individual egg rafts were, however, collected, reared and scored separately for wild type and mutant forms in each cross. In all crosses 25 males and 25 females were placed in an 8 × 8 × 8 inches cage made of an iron frame covered with nylon mosquito net. The males and females used in the experiments were all originally isolated as single pupae in vials, then sexed before being introduced into the experimental cage.

The gross colour differences between the mutants and the wild type phenotypes were conspicuous to the naked eye and could readily be detected from some distance. The counting of the larval phenotypes was comparatively easy due to the marked differentiation of the colour, especially during the third and fourth instars. Therefore, counts requiring colour segregation were made even without recourse to any visual aid.

Rearing of all stages and the experiments themselves were done in a controlled environment. The temperature was maintained at $25 \pm 1°C$ and the relative humidity of $80 \pm 10\%$. The rearing procedure was kept constant throughout the course of this investigation.

The mutants greyish brown and dark larvae were crossed with wild type and were scored in the fourth instar and these larvae were kept separately, sexed in pupal stages, and they were again scored as adults for further verification of the results. The results of these crosses are given in the tables 1 and 2.

The appearance of normal larvae in the F_1 crosses (1 and 2 in tables 1 and 2) suggested that the genes *gb* and *da* were recessive to its normal alleles. The F_1 heterozygotes were then back crossed with the presumptive homozygotes of both sexes. The results of these back crosses (crosses 3, 4, 5 & 6 in tables 1 and 2) revealed the expected 1:1 ratio of wild type to mutants. F_1 adults were sib-mated to produce an F_2 generation. The results of the crosses 7 and 8 involving the inbreeding of each mutant of the F_1 fit the expected 3:1 ratio of wild type to mutants (tables 1 and 2). Thus, the above crosses clearly show that the gene *gb* and *da* are recessive and autosomal.

The mutant greyish brown larvae has not been reported so far in *C. quinquefasciatus*. The melanotic larvae reported in *C. pipiens* is lethal in homozygous condition[4]. However, the mutant dark larvae reported here is known for good viability.

Crosses were made between the larval colour mutants of *C. quinquefasciatus*[7]. These mutants include golden yellow (*go*), greyish brown (*gb*), brown (*br*) and green larvae (*g*). The experimental results proved that all the above four mutants belong to an allelic series.

The larval colour mutants greyish brown and dark are excellent markers with full penetrance, uniform expression and high viability in both the sexes.

This work was supported in part, by a grant from the Indian Council of Medical Research, New Delhi.

17 July 1984; Revised 2 November 1984

Table 1 Mode of inheritance of mutation greyish brown larvae (*gb*)

Cross No.	Parental genotype	Adult phenotype: Wild type ♂	Wild type ♀	Total No. of Wild type	Greyish Brown ♂	Greyish Brown ♀	Total No. of greyish Brown	X^2
1.	$\frac{gbm}{gbm} \times \frac{+m}{+M}$	235	201	436	—	—	—	—
2.	$\frac{+m}{+m} \times \frac{gbm}{gbM}$	319	299	618	—	—	—	—
3.	$\frac{+m}{gbm} \times \frac{gbm}{gbM}$	373	351	724	370	341	711	0.118*
4.	$\frac{gbm}{gbm} \times \frac{+m}{gbM}$	75	69	114	68	65	133	0.437*
5.	$\frac{gbm}{gbm} \times \frac{gbm}{+M}$	99	69	168	95	89	184	0.727*
6.	$\frac{gbm}{+m} \times \frac{gbm}{gbM}$	70	79	148	102	80	102	3.503*
7.	$\frac{gbm}{+m} \times \frac{gbm}{+M}$	230	225	455	86	80	166	0.956*
8.	$\frac{+m}{gbm} \times \frac{+m}{gbM}$	440	396	836	140	146	286	0.144*

* not significant

Table 2 *Mode of inheritance of mutation dark larvae* (*da*)

Cross No.	Parental genotype	Adult phenotype: Wild type ♂	Wild type ♀	Total No. of Wild type	Dark larvae ♂	Dark larvae ♀	Total No. of dark larvae	X^2
1.	$\frac{+m}{+m} \times \frac{dam}{daM}$	166	157	323	—	—	—	—
2.	$\frac{dam}{dam} \times \frac{+m}{+M}$	249	238	487	—	—	—	—
3.	$\frac{dam}{dam} \times \frac{+m}{daM}$	116	109	225	108	99	207	0.750*
4.	$\frac{+m}{dam} \times \frac{dam}{daM}$	337	308	645	320	317	637	0.050*
5.	$\frac{dam}{+m} \times \frac{dam}{daM}$	323	310	633	310	294	604	0.680*
6.	$\frac{dam}{dam} \times \frac{dam}{+M}$	225	204	429	206	186	392	1.668*
7.	$\frac{+m}{dam} \times \frac{+m}{daM}$	286	275	561	110	94	204	1.133*
8.	$\frac{dam}{+m} \times \frac{dam}{+M}$	435	420	855	143	136	279	0.092*

* not significant

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ANNOUNCEMENT

IAEA PROGRAMME OF SCIENTIFIC MEETINGS

Eight major scientific conferences and symposia will be convened by the International Atomic Energy Agency (*IAEA*) in 1985. Two of these meetings will be held in Vienna. At the invitation of the governments concerned, the others will be held in the Federal Republic of Germany, France, Italy and the USA.

Conferences and Symposia:

1. Conference on Neutron Scattering in the '90s, Jülich, F.R. Germany, 14–18 January; 2. FAO/IAEA Symposium on Food Irradiation Processing, Wasnington DC, USA, 4–8 March; 3. Symposium on Advances in Nuclear Power Plant Availability, Maintainability and Operation, Munich, F. R. Germany, 20–24 May; 4. Symposium on Fast Breeder Reactors—Experience and Future Trends, Lyons, France, 22–26 July; 5. FAO/IAEA Symposium on Nuclear Techniques and In-vitro Culture for Plant Improvement, Vienna, Austria, 19–23 August; 6. Symposium on Nuclear Medicine and Related Medical Applications of Nuclear Techniques in Developing Countries, Vienna, Austria, 26–30 August; 7. Symposium on Source Term Evaluation for Accident Conditions, Columbus, Ohio, USA, 28 October–1 November; 8. Symposium on Emergency Planning and Preparedness for Nuclear Facilities, Rome, Italy, 4–8 November

Seminars:

In addition there will be several scientific seminars: 1. Seminar on Implications of Probabilistic Risk Assessment, Blackpool, UK, 18–22 March; 2. Seminar on Quality Control in Radioimmunoassay in Latin America, Buenos Aires, Argentina, 29 April–2 May; 3. Seminar on Nuclear Law and Safety Regulations for Developing Countries in Africa, Cairo, Egypt 6–11 May; 4. FAO/IAEA Seminar for Africa and the Middle East on Research Using Nuclear Techniques Aimed at Improving Meat, Milk and Wool Production from Ruminant Animals, Ankara, Turkey, 3–7 June; 5. FAO/IAEA Seminar on Research and Development of Controlled Release Technology for Agrochemicals using Isotopes, Vienna, Austria, 1–5 July; 6. Seminar on Applied Research and Service Activities for Research Reactor Operations, Copenhagen, Denmark, 9–13 September; 7. Seminar on Costs and Financing of Nuclear Power Programmes in Developing Countries, Vienna, Austria, 9–12 September; 8. Seminar on Management Options for Low and Intermediate Level Wastes in Latin America, Lima, Peru, 7–11 October; 9. INIS Training Seminar, Vienna, Austria, 7–11/14–18 October; 10. Seminar on Modifications Required for Safety of Nuclear Facilities (Backfitting), Munich, F. R. Germany, 11–15 November; 11. Seminar on Practices for Radiation Sterilization of Medical Supplies suited to the Upgrading of Local Health Care Services for Developing Countries in Africa and the Middle East; 12. Seminar on Application of Isotope and Nuclear Techniques in Hydrology in Arid and Semi-arid Lands in Asia and the Pacific, the Middle East and Africa,

Detailed information may be obtained from the appropriate national authorities in Member States, *e.g.* the Ministry of Foreign Affairs, or the National atomic energy authority, or by writing directly to the International Atomic Energy Agency, P. O. Box 100, Vienna International Centre, A-1400 Vienna, Austria.

Participants are designated either by the Government of a Member State of the IAEA, or the co-sponsoring organization, or by an international organization invited to participate. If individuals wish to attend the meetings, they are admitted as observers only.

The IAEA will publish the proceedings of the Conferences and Symposia as soon as possible. Requests for publications should be sent directly to the Devision of Publications, IAEA, Vienna, or can be obtained from the designated sales agents in Member States (list available on request).