

Zeitschrift:	Mitteilungen der Schweizerischen Entomologischen Gesellschaft = Bulletin de la Société Entomologique Suisse = Journal of the Swiss Entomological Society
Herausgeber:	Schweizerische Entomologische Gesellschaft
Band:	56 (1983)
Heft:	3-4
Artikel:	Genetics of "distorted" (d) in Culex pipiens fatigans
Autor:	Ahmad, Waseem / Ara, Anjum / Adhami, U.M.
DOI:	https://doi.org/10.5169/seals-402084

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 20.08.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Genetics of «distorted» (d) in *Culex pipiens fatigans*

WASEEM AHMAD, ANJUM ARA & U. M. ADHAM

Section of Genetics, Department of Zoology, Aligarh Muslim University, Aligarh - 202001, India

The autosomal recessive mutant «*distorted*» (*d*), isolated from the isogenic laboratory strain of *Culex pipiens fatigans*, affects the whole body in both sexes being more pronounced in females. The antennae are curved, wings curled and crumpled and legs often wobbly and undulating.

In the course of routine examination individuals of *Culex pipiens fatigans* showing abnormality in various parts of the body were discovered; the antennae appeared curved, wings crumpled and curled upward through almost half the length and the legs were wobbly and undulating. Females were generally more seriously affected than the males. Since various parts of the body are distorted, the character has been named «*distorted*» (Fig. 1).

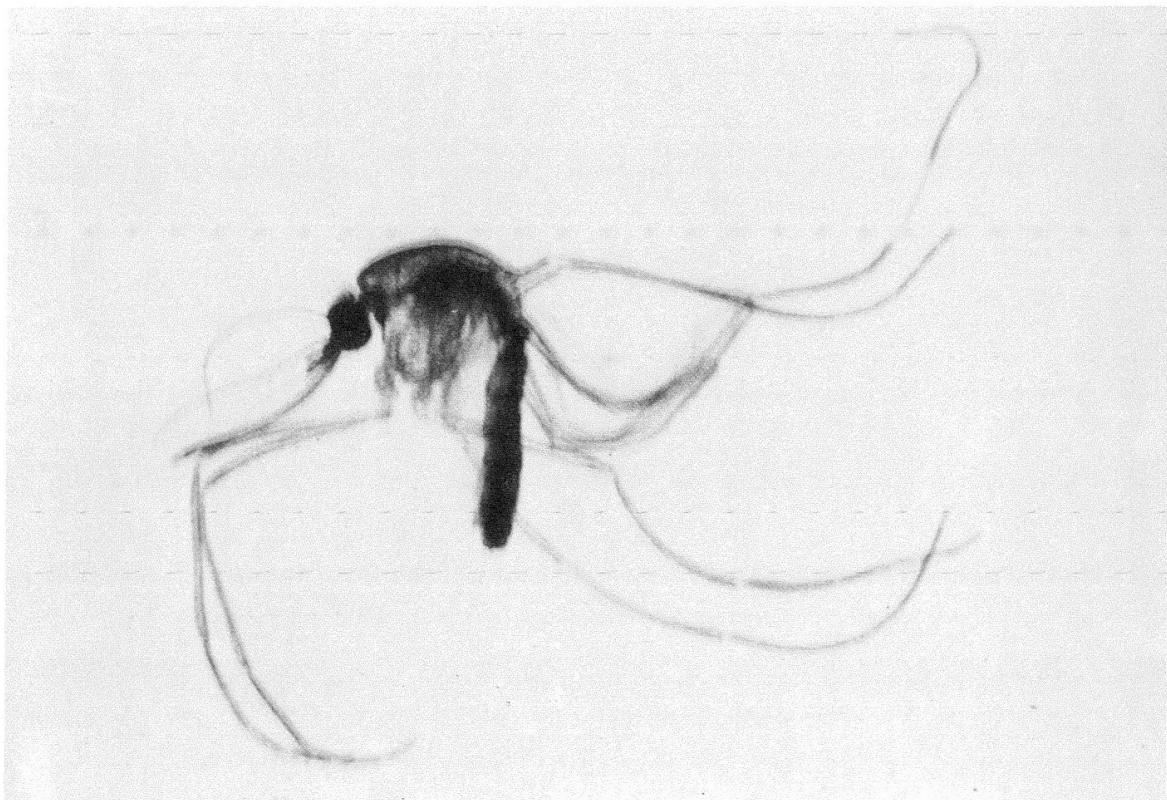


Fig. 1: The mutant *distorted* (*d*) in *Culex pipiens fatigans* showing curved antennae, curly wings and wobbly legs.

METHODS

Much difficulty was encountered in breeding this mutant. Individuals appearing comparatively active and healthy were selected and given special attention in rearing operation. Crosses were still hampered due to difficulties in mating, low viability and high mortality associated at almost all stages. The rearing schedule described elsewhere (AHMAD & ADHAM, 1980) was applied under controlled conditions ($27 \pm 2^\circ\text{C}$ & $75 \pm 5\%$ RH).

RESULTS

The results of mass crosses as summarized in Table 1., show that when mutant females were crossed to wild type males, all of the progeny were normal. The same result was obtained in the reciprocal cross. F_2 progeny obtained by crossing F_1 individuals, consisted of both normal and mutant phenotypes, the proportion being concordant with a 3 : 1 segregation. Similarly, both backcrosses yielded an approximate 1 : 1 segregation. The cross between mutant females and males gave an all mutant progeny.

The data were further confirmed by single-pair matings in all the directions. The results, therefore, clearly indicate that «distorted» is a monofactorial trait controlled by an autosomal recessive gene, now being assigned the symbol *d*.

Expressivity showed a wide range depending on the intensity of the abnormality and the body parts affected. However, mutants could easily be separated from wild type in at least 85% of individuals.

Table 1: Inheritance of *distorted* in *Culex pipiens fatigans*. Phenotypes: m = mutant, w = wildtype

No.	Type of Cross	$\text{♀} \times \text{♂}$	Total	Wildtype	Mutant	χ^2
1.	m x w	*	119	119	—	—
		**	31.2 ± 2.24	31.2 ± 2.24		
2.	w x m	*	209	209	—	—
		**	40.8 ± 4.21	40.8 ± 4.21		
3.	F_1 x F_1	*	120	94	26	0.53
		**	32.2 ± 4.97	24.9 ± 3.29	7.1 ± 2.01	
4.	m x F_1	*	163	86	77	0.24
		**	38.3 ± 3.00	22.0 ± 1.16	16.3 ± 1.14	
5.	F_1 x m	*	120	66	54	0.60
		**	48.3 ± 5.76	28.0 ± 4.53	20.3 ± 2.23	
6.	m x m	*	42	—	42	—
		**	30.3 ± 3.76	—	30.3 ± 3.76	

* Mass cross (10 ♀ : 10 ♂); χ^2 , $P < 0.05$

** Single pair mating, 10 replicates; \pm = standard error

The larvae seem to develop normally in early stages but have high mortality there-after, which becomes still higher during and shortly after emergence. Quite a few are unable to extricate their legs from the pupal case while others, unable to fly, fail to leave the surface of water and are drowned. The adults more frequently walk than fly in the cages. The difficulty in flying may result in reduced matings and low fertility, thus making the trait semi-lethal, whereby the *distorted* character is more pronounced in females.

The morphological characters as well as viability problems associated with this mutant are similar to the mutations involving wings like «short wing» in *Aedes aegypti* (UPPAL *et al.*, 1976); and *Culex tritaeniorhynchus* (SAKAI & BAKER, 1977); «curved wing» in *Aedes togoi* (TADANO, 1978) and «curly» in *Culex tritaeniorhynchus* (BAKER & SAKAI, 1977), and also comparable to.

RESUMÉ

Génétique de «distorted» (d) chez Culex pipiens fatigans - Le mutant récessif autosomal (d), isolé d'une souche isogène de *Culex pipiens fatigans*, s'exprime dans le corps entier chez les deux sexes, plus particulièrement chez les femelles. Les antennes se courbent, les ailes se bouclent et se froissent, et les jambes souvent tremblent et font des mouvements ondulants.

ACKNOWLEDGEMENTS

We thank the Chairman, Department of Zoology, Aligarh Muslim University, Aligarh for providing laboratory facilities and the Council of Scientific and Industrial Research, (CSIR) for providing financial help in the form of Post Doctoral Fellowship to Waseem Ahmad.

REFERENCES

- AHMAD, WASEEM, 1980. *A new mutant black scales (bs) in Culex pipiens fatigans*. Proc. Symp. Sci. Tech. Ecosys.: 84-89.
BAKER, R. H. & SAKAI, R. K., 1977. *The genetics of curly, a dominant, sex-linked mutant of Culex tritaeniorhynchus*. J. Med. Ent. 13(4/5): 614-616.
SAKAI, R. K. & BAKER, R. H., 1977. *Short wing, a recessive mutant on chromosome I in Culex tritaeniorhynchus*. Mosq. News, 37(4): 686-688.
TADANO, TAKEO, 1978. *Genetics of a new mutant, curved wing, of the mosquito Aedes togoi*. Ann. Trop. Med. Parasitol. 72(3): 263-268.
UPPAL, D. K., CURTIS, C. F. & SONI, V. K., 1976. *A new sex-linked mutant, short wing in Aedes aegypti*. Heredity, 36: 147-150.

(received April 4, 1983)

