NOTE

A Yellow Mutant of *Heliothis virescens* (Lepidoptera: Noctuidae)[1]

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Three 'yellow' male tobacco budworm moths, *Heliothis virescens* (F.), were found in our laboratory culture at Gainesville, FL. The yellow moths were mated with wild-type (WT) tobacco budworm females by placing the males and four females in a single cage. The 'yellow' progeny resulting from the initial mating then were mated, again by holding males and females in a single cage, to establish a true breeding yellow strain. Crosses were made to establish the phenotype and inheritance of the yellow body color trait.

The mutant adults appeared normal except for the conspicuous yellow pigmentation of their wing and body scales (Fig. 1). By contrast, WT tobacco budworm moths typically are light green with three diagonal olive bands across the forewings. The forewings of the yellow strain females retain visible diagonal bands that are a darker yellow than the rest of the body scales. However, the bands on the forewings of the yellow strain males are either absent or only just barely perceptible from the yellow wing background.

Individual pairs of each of the crosses shown in Table 1 (10 replications of each) were confined in 0.4-liter paper cartons for oviposition. The moths were fed a 10% honey-water solution and allowed to oviposit on white organdy cloth placed in the top of the cartons. The crosses were held separately in rearing chambers maintained at approximately 27° C, 50% relative humidity, and a 14 h light: 10 h dark photocycle.

Fifty to 100 newly hatched larvae from each cross were transferred to plastic jelly cells filled with a modified pinto bean diet (Guy, R. H., N. C. Leppla, J. R. Rye, C. W. Green, S. L. Barrette and K. A. Hollien, 1985, *Trichoplusia ni*, Handbook of Insect Rearing, Vol. 2, pp. 487-494, P. Singh and R. F. Moore (eds.), Elsevier Science Publishers, B. V., Amsterdam). Subsequently, the pupae were removed, sorted by sex, and held for adult emergence.

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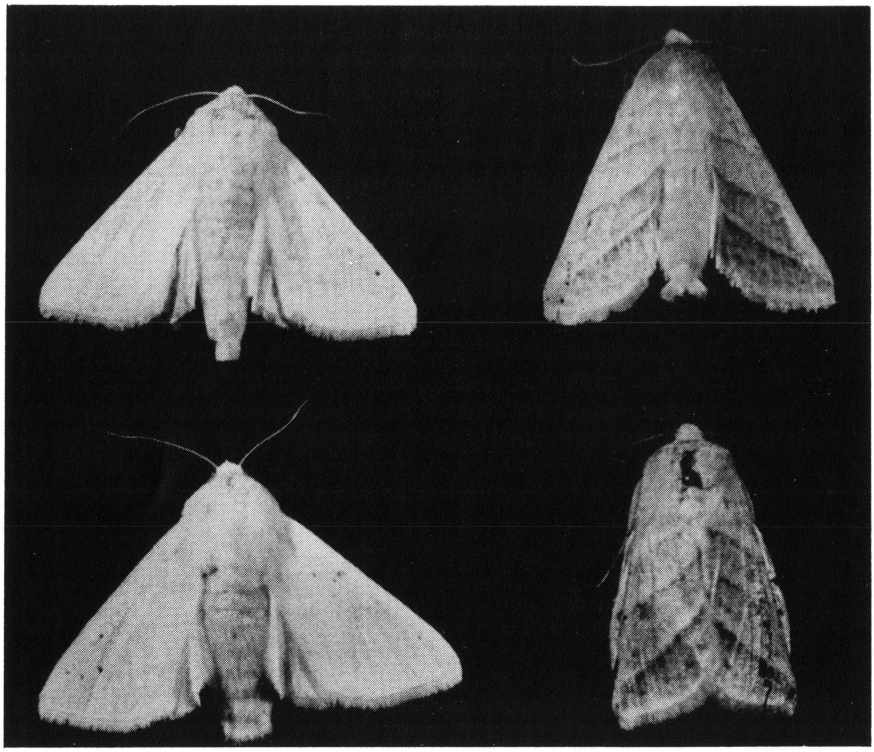

Fig. 1. Tobacco budworm moths: Yellow male (top left); wild-type male (top right); yellow female (bottom left); wild-type female (bottom right).

Segregation for body color in the various crosses (Table 1) indicated that the yellow phenotype is controlled by an autosomal recessive allele in homozygous form. Observed phenotype ratios for the various F_1 intercrosses and backcrosses were not significantly different from the expected Mendelian ratios (x^2, $P < 0.50$; Steel, R. G. D. and J. H. Torrie, 1960, Principles and Procedures of Statistics, McGraw-Hill, New York).

When yellow moths were crossed, all progeny produced were of yellow phenotype. The $F_1 \times F_1$ crosses yielded a 3:1 ratio of wild-type:yellow moths. In addition, the sex ratio within each phenotypic class was approximately 1:1. These data demonstrate that the gene for yellow body scales is a typical Mendelian autosomal recessive.

A yellow pupal body (*yb*), sex-linked mutant of the tobacco budworm was isolated from a cross between an irradiated male and unirradiated female (Proshold, F. I., 1974, A yellow pupal body, sex-linked mutant in the tobacco budworm, *Heliothis virescens* [Lepidoptera: Noctuidae], Can. Entomol.

Table 1. Segregation for body color in crosses of wild-type and yellow tobacco budworm moths.

Cross* Male × Female	Number of Adults				Ratio	
	Male		Female		Actual	Expected
	WT	yel	WT	yel	WT: yel	WT: yel
	Parental Crosses					
yel × WT	230	0	210	0	440:0	440:0
yel × yel	0	360	0	304	0:664	0:664
	Backcrosses					
F_1 × yel	108	102	118	108	226:210	218:218
yel × F_1	119	113	90	95	209:208	208:208
F_1 × F_1	102	46	118	43	220:89	231:77

* WT = wild-type tobacco budworm moths typically have light green body scales with three diagonal olive bands across the forewings; yel = yellow moths; F_1 moths (phenotype the same as wild-type).

106: 1195-1200). Proshold concluded that the *yb* mutant would be unable to persist if introduced into a randomly breeding population of tobacco budworms because the mating, fertility, and survival characteristics of the mutant were such that selection would favor the wild-type moth. Proshold further surmised that although of limited use in field situations, this sex-linked gene possibly could be used to enhance our knowledge of the genetics of the tobacco budworm.

The yellow strain of tobacco budworm moth described here potentially is a useful marker in population studies, especially involving the release-recapture of laboratory-reared specimens. Yellow males and females can fly, and they will mate readily with yellow as well as wild-type moths. Further studies are needed to determine whether any abnormalities exist in the behavior or physiology of the yellow moth that might detract from the usefulness of this marker for field studies.

There is no evidence that the gene for yellow body color is sex linked as with *yb* pupal mutant described by Proshold (1974). However, the introduction of yellow moths into a randomly breeding population of tobacco budworm probably would meet the same fate as the *yb* mutant, i.e., gene selection would favor the wild-type trait over yellow and yellow moths would be rare.

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