

At the time of the disturbance in the mouse colony, the manufacturer of the pellets had not yet begun regular production of cattle supplements containing stilbestrol. However, it was learned that at least one batch of such feed had been prepared at the request of a local veterinarian and that the same mixing equipment had been used to process both the cattle feed and the mouse pellets. As far as we could determine, the cattle supplement had been processed at about the time of preparation of the first lot of pellets that showed estrogenic activity. The processing equipment presumably contained residual drug for some time afterward, since several subsequent lots of mouse feed also had demonstrable estrogenic activity.

In view of our findings, the use of common processing equipment for the preparation of feeds for laboratory animals and livestock supplements containing stilbestrol would seem to represent a serious potential hazard. All groups concerned—feed manufacturers, breeders of laboratory animals, and the laboratory worker—should be cognizant of the problem, since undoubtedly our experience is not unique.

W. J. HADLOW

EDWARD F. GRIMES

National Microbiological Institute,
Rocky Mountain Laboratory,
Hamilton, Montana

GEORGE E. JAY, JR.

Laboratory Aids Branch,
National Institutes of Health,
Bethesda, Maryland

Note

1. Roy Hertz, National Cancer Institute, National Institutes of Health, kindly performed the bioassays for estrogenic activity.

5 August 1955

Factors Influencing Curvature in the *Avena* Test for Plant Hormones

In the present study, attempts have been made to determine factors influencing the response of *Avena* coleoptiles to a given concentration of indole-3-acetic acid (IAA) (1). The standard *Avena* test method as described by Went (2) was used, but with variations as noted. Standard IAA solutions ranged from 15 to 160 µg/lit.

Preillumination by varying exposures to red light, or complete absence of light, during the 3 days of growth prior to testing did not consistently increase or decrease curvature. Red light is customarily used during this period to prevent elongation of the first internode; this facilitates pulling the primary leaf in the second decapitation but produces no effect on curvature.

Table 1. Effect of time interval between the second decapitation and the application of agar blocks. Each figure for curvature represents the average of six plants in response to the indicated IAA level

Time lapse (min)	Curvature (deg) at IAA levels			
	20 µg/lit	40 µg/lit	80 µg/lit	160 µg/lit
5	21.6	33.1	45.5	43.0
15	16.9	27.6	39.0	37.0
30	18.0	24.0	30.3	27.1
60	16.1	19.0	26.1	25.0

High temperatures, often thought to decrease the *Avena* response, had no noticeable effect. Even at 31 to 32°C, excellent curvatures were obtained.

Subsequently, a marked increase in curvature was found when the interval between the second decapitation and application of agar blocks was held to a minimum. The effect of this time lag is shown in Table 1. This effect was demonstrated repeatedly and without fail. The previous practice in this laboratory had been to decapitate the entire series of test seedlings, that is, 10 rows of 12 plants each, and then to apply the agar blocks, imposing a ½- to 1-hour delay between the operations. The present practice is to apply the agar blocks after each row is decapitated. By this method, a single plant may have a curvature of more than 50 deg in response to 100 µg/lit of IAA. By the previous method, about 30 deg was considered the maximum response.

The time lapse between the first and second decapitation had a minor effect on the curvature response. Table 2 indicates that the longer interval between decapitations is preferable.

Reexamination of data presented by Goodwin (3) using the soil culture *Avena* technique and by Schneider and Went (4) in recommending a second decapitation points to increased sensitivity in agreement with these findings.

The results of the present investigation suggest that auxin regeneration within the

Table 2. Effect of time interval between the first and second decapitation. Each figure for curvature represents the average of 8 to 12 plants. Agar blocks applied 10 to 15 minutes after second decapitation, that is, every two rows

Time lapse (hr)	Curvature (deg) at IAA levels			
	15 µg/lit	25 µg/lit	50 µg/lit	100 µg/lit
1	11.4	18.1	26.3	36.4
3*	16.4	22.6	31.9	44.7
4	15.9	29.8	38.3	46.0

* Standard interval.

coleoptile tip may be responsible for the striking differences in curvature response. The longer interval between the first and second decapitation would diminish auxin regeneration after the second decapitation. The immediate application of agar blocks would permit the maximum effect of unilateral application of IAA before auxin is uniformly regenerated throughout the coleoptile tip.

Supporting evidence is found in the high curvatures reported by Skoog (5) in the deseeded *Avena* method in which removal of the seed prevents regeneration.

If rapid regeneration of auxin is the case, it might in turn be influenced by preillumination or high temperatures, making the immediate application of agar blocks more or less critical.

Recent reports in the literature indicate that investigators often rely on small differences between average curvatures of less than 10 deg. Increasing the sensitivity of the *Avena* plants by the immediate application of agar blocks will increase the reliability of results as well as eliminate some of the variability found between laboratories.

MARTHA J. KENT

Pineapple Research Institute
of Hawaii, Honolulu

References and Notes

1. Published with the approval of the director as technical paper No. 235 of the Pineapple Research Institute of Hawaii.
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3. R. H. Goodwin, *Am. J. Botany* 26, 74 (1939).
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8 June 1955

Influence of Thyroxin and Thyroglobulin on Rice Moth Larva

The influence of thyroxin and other thyroidal preparations in different insects has been studied from time to time by various workers (1); and, as has been assumed by Goldsmith (2), much of the experimental work carried out so far in this field is open to criticism in that dosages were not adequately controlled (possible improvement of the ration by the thyroid supplement or possible toxicity of higher concentrations), and the insects were not of known ancestry. Further, there was no uniformity in the thyroidal preparations used; many used thyroid extracts, some used hydrolyzed thyroids, while a few others used thyroid substance itself from various mammals. It was therefore considered worth while to reinvestigate this subject by using thyroidal preparations of known potency and the larva of an insect that can be easily grown and a pure strain maintained under standard laboratory conditions.

In our investigation the influence of various doses of pure crystalline thyroxine (as sodium salt) and cattle thyroglobulin (prepared by the method of Roche *et al.*, 3) on the growth of rice moth larvae (*Corcyra cephalonica* St.) was studied. In each set of experiments, 15 petri dishes (14 cm in diameter) containing 10 g of white wheat flour and different concentrations of thyroxine or thyroglobulin, as detailed in Table 1, were seeded with 5 mg of fresh eggs of the moth collected during the previous 24 hours. At the end of 15 days, two batches of 10 larvae were picked up from each dish and weighed separately, and the average weight of the larvae in each dish was obtained. The average values of three such sets are given in Table 1.

It will be seen from these results that thyroxine up to a dose of 0.75 $\mu\text{g/g}$ of diet has a definite growth-promoting effect on the larvae, while higher doses bring about inhibition of growth and even death at a concentration of 20 $\mu\text{g/g}$ of diet. Thyroglobulin in all the concentrations used failed to show any influence on the growth of the larvae.

The results of oxygen-consumption studies with the larvae fed on different doses of thyroxine or thyroglobulin for a period of 15 days are given in Fig. 1. These results show that thyroxine feeding increases the oxygen requirement, whereas thyroglobulin was not quite effective. The slight increase in the oxygen consumption in the thyroglobulin-fed group over those of the control group can be attributed to the addition to the ration

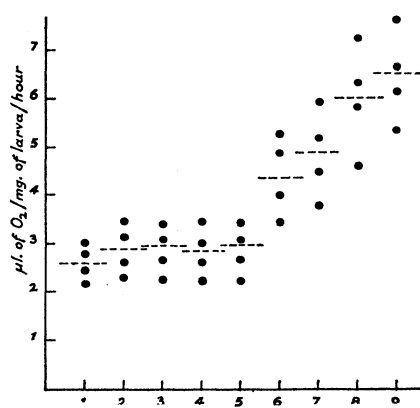


Fig. 1. Influence of thyroxine and thyroglobulin feeding on the oxygen consumption of rice moth larva. (1) Control group (10 g wheat flour); (2) wheat flour (9.5 g) + casein (500 mg); (3) wheat flour (9 g) + casein (1 g); (4) wheat flour (9.5 g) + thyroglobulin (equivalent to 0.29 μg of thyroxine per gram of diet); (5) wheat flour (9 g) + thyroglobulin (equivalent to 0.58 μg of thyroxine per gram of diet); (6) wheat flour (10 g) + 1 μg of thyroxine; (7) wheat flour (10 g) + 3 μg of thyroxine; (8) wheat flour (10 g) + 6 μg of thyroxine; (9) wheat flour (10 g) + 10 μg of thyroxine.

of the animal protein, because a similar slight increase was noticed with the casein-fed group also (Nos. 2 and 3 in Fig. 1). These results show that the larvae, although they do not normally require thyroxine for their growth and maintenance, are still able to utilize thyroxine for their metabolic activity and are unable to use thyroglobulin as a source of thyroxine. This is probably due to their inability to split the protein completely. The influence on the growth would have depended on the amount of free thyroxine present in the various thyroid preparations used by different workers, and this may account for the peculiar results obtained by earlier workers.

These studies show, in addition, that rice moth larva (*Corcyra cephalonica* St.) can serve as a suitable organism for the study of thyroxine metabolism. Studies of the influence of triiodothyronine and other related investigations on this organism are in progress.

V. SRINIVASAN
N. R. MOUDGAL
P. S. SARMA

Biochemistry Department,
University of Madras, Madras 25, India

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24 May 1955

University Chemistry Teachers

The following survey of the characteristics of university chemistry teachers was made from the data in the American Chemical Society publication *Faculties, Publications and Doctoral Theses in Chemistry and Chemical Engineering* (1953), supplemented by information from the 1954 edition of *American Men of Science*.

According to the report, there are 89 departments of chemistry offering both bachelor's and doctor's degrees; the 89 departments employ 1465 professorial employees. Of this group 35 percent claim to be physical chemists (including chemical physicists and nuclear chemists), 29 percent are organic chemists, 12 percent are inorganic chemists, 11 percent are analytic chemists, 8 percent are biochemists, and the remaining 5 percent are not classified. Where more than one specialty was indicated, only the first mentioned was counted.

A high concentration of physical chemists at Princeton, Yale, Cornell, Columbia, Chicago, California (Berkeley), and the Massachusetts and California Institutes of Technology was noted, 48 percent of their faculties being so classified, with only 25 percent listed as organic chemists. The schools of the Big Ten (Illinois, Michigan, Minnesota, Wisconsin, Northwestern, Purdue, Indiana, Ohio State, Iowa, and Michigan State) had 31 percent in each of these two major specialties.

The universities from which the faculty members received their own doctorates were few. A total of 34 percent held a Ph.D. degree from Princeton, Harvard, Yale, Columbia, Cornell, Chicago, California (Berkeley), M.I.T. or Caltech, while another 28 percent came from the Big Ten schools. Only 50 persons in the group received a foreign doctorate. It is interesting that 18 of the 19 schools listed in this paragraph obtained 84 percent of their own faculties from within this select group of universities. (Harvard did not provide data for its faculty.)

Regional and environmental preferences are important in a teacher's location. Thus, 48 percent of Big Ten faculty members have a Ph.D. degree from a Big Ten school; 52 percent of the faculties of Princeton, Yale, Cornell, Columbia, and M.I.T. have degrees from these institutions or Harvard; and 63 percent of the California, Caltech, and Chicago faculties have the Ph.D. degree from one of the three. Less than 15 percent of the faculties of the other 71 universities in the report have the Ph.D. degree from the same school at which they work.

The age distribution of the group was as follows: 73 were born before

Table 1. Influence of thyroxine and thyroglobulin on rice moth larvae at the end of 15 days' growth

Dish No.	Thyroxine content in diet ($\mu\text{g/g}$)	Thyroglobulin expressed as its thyroxine equivalent (μg thyroxine/g diet)	Avg. wt. of larvae (mg)
1			3.05
<i>Thyroxine-fed group</i>			
2	0.10		3.03
3	0.20		5.36
4	0.30		6.91
5	0.40		7.39
6	0.50		9.29
7	0.75		9.59
8	1.00		6.91
9	2.00		5.96
10	20.00		2.45
<i>Thyroglobulin-fed group</i>			
11		0.058	3.00
12		0.145	2.98
13		0.290	3.02
14		1.450	3.00
15		2.900	3.04