centration in different samples ranges from 2 to 25 mg/l and is extremely variable. Concentration in a single sample is constant for 4 days at room temperature (25°–30° C), after which it takes a sharp drop. A short period of boiling does not change the concentration.

The following characteristics of the oysters' behavior in response to the substance are clearly indicated now: The response is directly correlated with changing concentrations; other factors being equal, the greater the carbohydrate concentration the more water the oyster pumps.

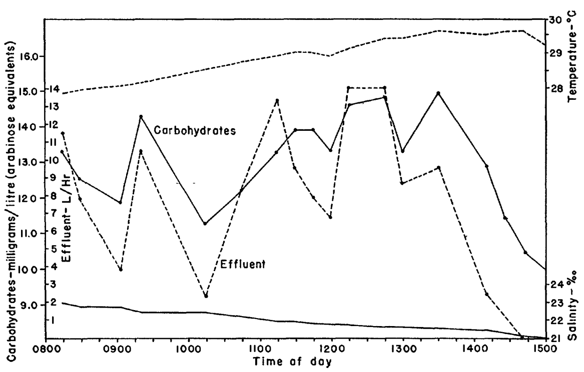

FIG. 1. Relationship between carbohydrate concentration (mg/l in terms of arabinose) and the effluent of a single oyster measured simultaneously. Salinity and temperature determinations were also made at the same moment. The depressed value for the effluent shown in hour 1100 was caused by a normal reflex closure of the valves of the oyster for voiding irritating solids.

The threshold value for pumping varies from oyster to oyster, but thus far (continuous bihourly observations started May 10, 1949) no oyster has remained open and pumped water when the concentration fell below 4.8 mg/l. As the water temperatures increase, the carbohydrate threshold for continued pumping seems to rise. Temperature appears to become especially critical above 28° C, the carbohydrate threshold rising to about 12 mg/l. Salinity variations within wide limits do not play a part. With salinity and temperature conditions within the optimum ranges but with the carbohydrate level below the threshold indicated, the oyster will open for a short period of time which we have come to call a "testing period." If this period coincides with a high carbohydrate value the oyster will immediately begin pumping; if it does not the oyster will close. We have observed this behavior for days at a time. The carbohydrate value can be high for 2 or 3 hr or longer without the oyster's "testing," in which case it will miss the high carbohydrate completely. Detailed, minute-by-minute observation demonstrates an almost immediate response of the oyster to changes in the concentration. (See Fig. 1.) The oyster removes from 5% to 15% of the substance from the water passed through its body.

In addition to the short interval observations shown in Fig. 1, we have now accumulated bihourly observations (24 hr per day) on ten oysters. As many as four of these have been run simultaneously for 30 days. Pairs have been run as long as 60 days. These long term studies are being projected into a field program to determine the ecological significance of this carbohydrate factor.

Experimental work is still in progress and all conclusions must remain tentative, but the indications listed above seem clear enough and of sufficient significance to be presented now. These results are particularly significant in the light of the work of Pütter (*4*), Krogh (*2*), Yonge (*5*), MacGinitie (*3*), Coe (*1*), and others.

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Maleic Hydrazide, a Selective Herbicide

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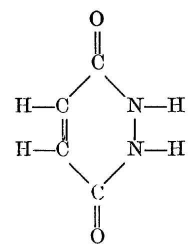
Among several products known to have growth-regulating properties and submitted to us for testing by the Naugatuck Chemical Division, U. S. Rubber Company, Naugatuck, Connecticut, was a sample of maleic hydrazide. It has the formula



and was supplied as the diethanolamine salt. The effect of maleic hydrazide on tomato plants was described as inhibitory (*1*); plants stopped growing for several weeks then resumed normal growth with little apparent injury. The amount of inhibition was proportional to the concentration employed.

Tests on barley and cotton reported here indicate that this compound may possibly prove to be a valuable selective herbicide. Two-week-old barley (var. Sacramento) and 5-week-old Upland cotton (var. Acala), grown in gallon cans, were sprayed to runoff in accordance with the tentative recommendations accompanying the product. The equivalent of 0.2% maleic hydrazide was used in aqueous solution, to which in some instances 0.024% Vatsol was added as a spreader. Spraying was carried out by means of an atomizer under constant pressure, with the plants on a revolving platform.

The immediate effect of maleic hydrazide on barley was to stop growth. This was detected a few days after treatment. Leaves turned dark green and slowly died back from the tips. After approximately 6 weeks, the barley was completely dead but the cotton was apparently

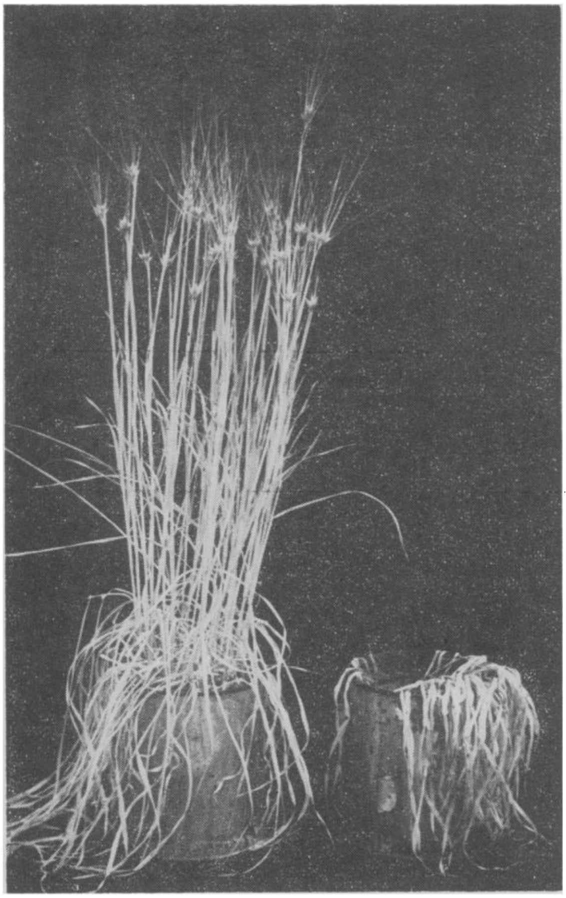


FIG. 1. Effect of maleic hydrazide on barley. Plants on the right treated; on the left untreated.

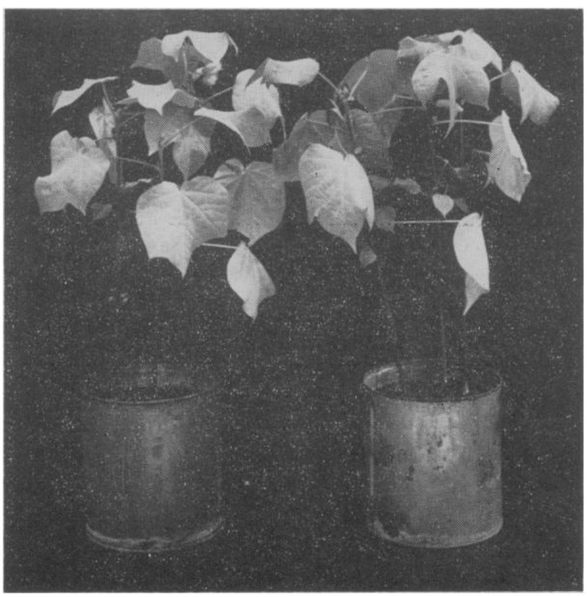


FIG. 2. Effect of maleic hydrazide on cotton. Plants on the right treated; on the left untreated.

unaffected. Even after 6 additional weeks, the treated cotton was in no way different from the control plants, both coming into flower at the same time. Addition of Vatsol caused more rapid killing of barley, but the end result otherwise was the same. No effect was discernible in cotton, with or without the spreader.

Subsequent tests have proved that various types of plants react quite differently to this new compound. Age of the plants is critical, in that young plants respond to a much greater extent. Cotton treated in the cotyledon stages was very severely inhibited, whereas plants 16 in. in height showed no apparent response. Age of grass plants is also critical. Young water grass (*Echinochloa Crus-galli*) and Johnson grass (*Holcus halepensis*) plants sprayed with 0.2% maleic hydrazide stopped growing, developed anthocyanin pigmentation, and finally died. Older plants showed some response but survived.

Control of grasses is essential to the mechanization of cotton harvesting in the West. Under field conditions, cotton can be kept relatively free of weeds until it is laid by. At this time young grass seedlings are able to grow so rapidly that the plants are tall enough by harvest time to be picked up by harvesters, producing grassy cotton. If this new chemical should provide a solution to this problem, it would prove to be an extremely valuable herbicide. For those who are studying chemical weed control, it presents a new and interesting selectivity. Results already obtained seem to justify very thorough testing of this compound.

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Effects of Irradiating Maize Pollen in a Nuclear Reactor on the F_1 Plants[1]

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The purpose of this paper is to report preliminary results in determining inherited changes induced by irradiating maize pollen in a nuclear reactor. The work was carried out by making crosses between untreated plants and plants with irradiated tassels, and subsequently studying the phenotypic effects on the F_1 plants. The irradiations were made in the heavy water pile of the Argonne National Laboratory.

The subject of hereditary effects of irradiations associated with the fission process has gained additional significance with the advent of the atomic bomb and the accompanying sharply intensified interest in nuclear energy. In this connection, studies have been made of hereditary changes in maize (*1, 2, 4*) and in cotton (*3*)

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