



GRAPHS SHOWING EFFECTS OF VARIOUS CONCENTRATIONS OF SODIUM THIOSULPHATE ON ROOT GROWTH AND PERCENTAGE GERMINATION OF CRESS (*Lepidium sativum*)

Similar calculations have been made from graphs constructed for other species investigated. These results appear in the accompanying table. Here the

Plant	Concentrations producing 50 per cent inhibition	
	Of root growth	Of germination
Garden pea	4.0 × M/1,000	31.0 × M/1,000
Cress	4.7 "	26.0 "
Cabbage	6.0 "	20.0 "
Rape	10.0 "	25.0 "
Maize	11.0 "	31.0 "
Flax	20.0 "	33.0 "
Radish	25.0 "	80.0 "
Mustard	27.0 "	15.0 "
Carrot	41.0 "	38.0 "

plants are arranged in order of decreasing sensitivity, judged on their root growth. It will be seen that there is a considerable range of sensitivity, from garden pea at the sensitive end of the scale to carrot at the insensitive end. On the whole, much higher concentrations are necessary to produce the same degree of inhibition of germination. Thus thiosulphate shows a considerable degree of selectivity in its toxic action on the growth of plant roots.

The effects of two other sulphur compounds, sodium dithionate and potassium trithionate, on cress have been investigated. Neither of these compounds is as toxic as sodium thiosulphate, the concentrations necessary to produce 50 per cent inhibition of root growth being 39 × M/1,000 for dithionate and 53 × M/1,000 for trithionate (compared with 4.7 × M/1,000 for thiosulphate).

It is hoped that experiments now in hand may elucidate the mechanism of these inhibitions.

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July 10.

¹ Audus and Quastel, *Nature*, 159, 320 (1947).

² Audus and Quastel, *Nature*, in the press.

Symbiosis in *Oliarius*

MAHDIHASSAN¹ has recently criticized my interpretation of symbiosis in the Fulgorid insect *Oliarius cuspidatus* Fieb., described by Šulc² in 1924. He states that what I interpreted as a mycetome is in fact the testis, the contents being spermatozoa rather than bacteria.

A glance at Šulc's figure, reproduced by Mahdihassan, should be a sufficient demonstration of the untenability of Mahdihassan's position. The object in question, which Šulc unfortunately called the 'interfollicular organ', has no efferent duct and is not composed of follicles. It is formed of a strange syncytium like that found in the bacterial-containing organs of cicad insects, with a low covering epithelium which sends thin septa into the cavity. This cavity is filled with long slender threads with scattered metachromatic nuclei in which all characteristics of sperm are lacking and which, without question, are bacteria.

Moreover, these so-called 'testes' are found in both sexes; and contrary to what Mahdihassan states, they have not been studied in this particular case alone. A pupil of mine, G. Richter³, was able to study another species, *Oliarius horisanus*, Mats., from Formosa, and found precisely the same type of complicated symbiotic arrangements in the female. Another pupil of mine, H. J. Müller, in his large "Monographie der Fulgoroiden-Symbiose", based on not less than 173 species, finds the same organs in both sexes of several species of *Oliarius*: *O. panzeri* P. Löw, from Germany, *O. tantalus* Gifford, from Hawaii, *O. villosus* F. and other unidentified species, from Brazil.

It was thus scarcely necessary for Mahdihassan to spend months at Brno, where Šulc made his studies, collecting material of a very rare species, to prove me guilty of so gross an error.

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¹ Mahdihassan, S., *Nature*, 159, 237 (1947).

² Šulc, R., *Pub. biol. l'école hautes études vétérinaires, Brno*, 3, 2 (1924).

³ Richter, G., *Z. Morph. u. Okol. der Tier.*, 10 (1928).

Inhibition of the Toxicity of 'Gammexane' for Insects

DURING the course of work on the effect of 'Gammexane' (pure gamma isomer of hexachlorocyclohexane) on the metabolism of fat, protein and carbohydrate by fourth-stage mosquito larvæ, it was observed that the concentration of 'Gammexane' tolerated in the presence of fat (olive oil) was higher than that in the presence of protein or carbohydrate. Further experiments with fourth-stage larvæ of *Aedes aegypti* and *Culex fatigans* confirmed this finding, and it was observed that liquid triglycerides in general provide a degree of protection for larvæ against 'Gammexane'. The findings of Buxton¹ and Upholt² indicate that this may be a similar phenomenon to that which results in the inactivation of D.D.T. when applied as a larvicide under natural conditions, suggested by Upholt to be due to adsorption by the organic constituents of mud.

The accompanying graph shows the effect of triolein (mixed in 5 per cent concentration on 0.1 gm. of kaolin) in reducing the mortality of larvæ exposed to