poorly buffered than in well buffered soil. The acids most toxic to germinating seeds and seedlings of tobacco were citric, malic, tartaric and nitric acids. Acetic acid was the least toxic to plants of the organic acids. Nitric acid was much more toxic to plants than was sulphuric acid.

When soil reaction is adjusted by acids, the germination and growth of plants can not be correlated with pH value of soil except for each acid considered separately; the optimum pH value of soil for growth of the plant depends on what acid was used to adjust the soil reaction.

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ENTEROMORPHA AND THE FOOD OF OYSTERS[1]

A NUMBER of investigators have suggested the probability that spores of algae may at times enter into the food supply of oysters, but the possible importance of this element under certain conditions seems not to have been realized. The purpose of this note is to point out that this factor is at times of very great significance to the oyster and presumably to other plankton feeders, and to suggest one reason why its importance has been underestimated. The observations upon which it is based were made in Barnegat Bay, New Jersey, during the summer of 1927, in connection with the oyster studies conducted by the Department of Biology of the New Jersey Agricultural Experiment Station.

Of the three species of Enteromorpha occurring in Barnegat Bay, *E. plumosa, E. intestinalis* and *E. compressa,* the last named is commonest, growing everywhere on shells and stakes, and also attached directly to the mud of the shores of the salt marshes which line a large part of the Bay. In 1927, the spring vegetative growth of this species was largely completed by June 15, and zoospore discharge had commenced, continuing at frequent intervals until the end of July, by which time practically the entire substance of the fronds, excepting only the old cell walls, had been converted into nannoplankton. During this period zoospore discharge took place an hour or two after sunrise on every quiet, clear day, the zoospores swarming actively until toward noon, when they began to settle. Thus there were four or five hours on every such day when the water contained countless swarms of these organisms. The zoospores are pyriform, with four flagella and a single chromatophore, mostly from 5 to 7 μ long and from 4 to 6 μ broad, although there is some variation beyond these limits. It is not surprising that cells as small as this are not present in net collections, but it is surprising that so little evidence of their presence is seen in examination of the stomach contents of oysters living and feeding in immediate proximity of the fronds. In order to see whether the zoospores are ingested, an oyster was placed in an aquarium together with a mass of Enteromorpha just about to discharge zoospores. The shells of the oyster were open most of the morning and it was evidently feeding actively. Shortly after noon it was opened and the stomach was found to be packed with a bright green mass of food material, yet when examined under the microscope, the mass contained few recognizable zoospores, the great majority of the organisms visibly present being either diatoms or peridines. There were, however, numerous masses of greenish matter immersed in mucus to be seen, and careful study of these under an oil immersion objective showed unmistakably that they were composed almost entirely of the partially disintegrated zoospores, which were obviously being digested much more rapidly than the larger and better protected forms.

As a further test, several oysters were kept out of water until their stomachs were largely emptied of food. They were then opened, and drops of the nearly colorless stomach contents were placed on slides to which Enteromorpha zoospores and small diatoms from cultures were added. Similar drops were added to small quantities of the same organisms in vials. In all cases, visible disintegration of the zoospores began within fifteen minutes; they were largely destroyed at the end of an hour, and only a few traces of them were left at the end of two hours. During the same time, there was no perceptible alteration in the appearance of the diatoms. Evidently, by reason of their very thin cell walls and minute size, the zoospores are quickly digested, while the better protected diatoms and peridines, and even such forms as Euglena, resist digestion for a much longer period. The enormous numbers of such spores liberated and their remarkably rapid assimilation suggest that under the conditions existing in Barnegat Bay the zoospores of Enteromorpha form an important element in the food of plankton eaters during such times as they are being discharged. To these must be added the spores of species of Ulva, Monostroma, Ectocarpus and Pylaiella, certain of which are at least locally abundant in the Bay, and not only add to the total amount of such food present, but materially lengthen the period during which it is available.

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