besides leaves. The technical description of the pathogen is as follows:

Short rods; single polar flagellum; gram negative; capsulated; non-spore former; agar colonies circular with entire margin, smooth, butyrous, raised and barium yellow, measuring 20 mm. after 8 days on potato dextrose; gelatin liquefied; starch hydrolysed; casein digested; hydrogen sulphide and ammonia produced from peptone; indol not produced; milk peptonised and litmus reduced; good growth in synthetic nitrate and Czapek's media; nitrite and ammonia not produced from nitrate; acid without gas from arabinose, dextrose, lactose, sucrose and starch; no growth in salicin; optimum temperature for growth 27-30° C.; thermal death point about 51° C.

From the morphological, cultural and biochemical responses, it is difficult to distinguish the Xanthomonas species under study from other Xanthomonas species. When host range of related and unrelated plants was tried it was observed that the pathogen is specific to L. pusilla only. Since there is no record of a Xanthomonas species on Apocynaceae as the pathogen is highly specific to its suspect, it is proposed to designate it a new species Xanthomonas lochnerae.

Fuller details will be published elsewhere.

M. K. Patel
M. J. Thirumalachar
V. V. Bhatt

Plant Pathological Lab.,
College of Agriculture,
Poona-5, October 7, 1954.

A NEW METHOD FOR THE STUDY OF CERCARIAE

The cercariae are usually studied alive either stained with vital dyes or unstained, the normal methods of fixing and subsequent staining being rather unsatisfactory. All these methods were disappointing with the amphistome cercariae of the Pigmentata group. The presence of a large amount of dark brown pigment and cystogenous cells prevented the study of the internal organs, particularly the rudiments of the genital system when the cercariae are studied alive. The brown pigment can of course be bleached, but even then the cystogenous cells interfere with staining. While the author was studying the life-history of an amphistome of cattle, a method was evolved which makes the study of internal organs possible. A drop of aceto-carmine (45 per cent. glacial acetic acid boiled with excess of carmine and filtered) is placed on a slide on which live cercariae are transferred and manipulated with steel needles to add the necessary amount of iron. After about 2 minutes a No. 0 cover glass is placed on the drop and the preparation is ready for examination. The aceto-carmine kills the cercariae in relaxed condition, dissolves the brown pigment, the cystogenous cells and the excretory granules, and at the same time fixes and stains the various organs. If necessary, the excess of stain can be washed with a drop of acetic acid (45 per cent. glacial). But it was found that permanent preparations are unsatisfactory. The author has used this method for a number of years with amphistome and other types of cercariae with great success.

Dept. of Zoology, Kunwar Suresh Singh
The University,
Lucknow, October 27, 1954.

UTILIZATION OF NATURAL BYPRODUCTS FOR THE CULTIVATION OF BLUE-GREEN ALGAE

The work of Allen, Gross and Harvey has proved the importance of trace elements as essential auxiliaries of the major nutrients, Ca, K, Mg, Na, Cl, S, P and N in the metabolism of planktonic organisms including diatoms. In their studies extracts of Ulva and Fucus, unsuspected as sources of trace elements, were actually found to induce the growth in cultures of diatoms in artificial sea-water. It has been shown elsewhere that the maximum growth of blue-green algae of salt water lagoons is dependent upon definite proportions of trace elements Mn, B, Cu, I, Fe, etc., besides those of the major nutrients mentioned above and that the soluble extracts from the sea-weeds are rich in these trace elements. The information is no doubt helpful, yet the addition of chemicals to increase the plankton would be costly and at present of little practical value in India. Cheap fertilizers and byproducts will have to be explored for this purpose. The present communication deals with the attempts made to utilize oilcakes, sea-weed composts and the wastes in the industries involving sea-weeds of high trace element content as possible sources as fertilizers for the production of fish food.

The artificial sea-water media were prepared according to the formula given by Lyman and Fleming. The cold water-soluble portions of two oilcakes, viz., gingelly oilcake and groundnut oilcake, were used in one series, that of
three sea-weed composites (Hypnea + cow dung; Hypnea + fish waste + cow dung and Sargassum + cow dung) in another and that of four species of sea-weeds, viz., Gracilaria lichenoides, Chondria dasycladis, Laurencia papillosa and Hypnea musciformis in a third series.

The quantity of the various trace elements present in the water-soluble portions of the above was determined by analysing separately the extracts prepared from 5-10 g. of the samples. The total trace element content and the amounts in the water-soluble portions are tabulated in Table I.

To 10 ml. of the media in petri dishes were added 1, 2 and 3 ml. of the sterilized extracts separately. To these dishes equal quantities of an algal association (5 mg.) from a stock culture were inoculated. The composition of the algal association was as follows:

Phormidium tenue (Menegh.) Gom.—dominant.
Phormidium ambiguum Gom.—common.
Microcoleus chthonoplastes Thuret.—common.
Nitzschia vitrea Norman.—sub-dominant.
Nitzschia seriata—rare.
Gloeocapsa arenaria (Hass.) Rabh. (also its nannocyct stage)—few
Gymnodinium sp. (Dinoflagellate)—rare.

The growth obtained in the controls and in the treatment vessels after one month was estimated separately and the results are tabulated in Table II.

It may be seen from Table I that in the case of almost all the trace elements nearly 30 per cent. are present in a water-soluble form, and that all the algae screened are sufficiently rich in trace elements except L. papillosa. Table II affords evidence of good growth of algae in the treatment vessels, especially those treated with the extracts from G. lichenoides, C. dasycladis and H. musciformis. There was similarity in the cultures in species composition. The extracts from the two oilcakes do not seem to favour the growth of the algae to any appreciable extent. This may be because of the absence of several of the essential trace elements in them as may be seen from Table I.
My grateful thanks are due to Dr. N. K. Panikkar, for his keen interest in the work and to Dr. (Mrs.) F. Thivy for the identification of the algae.

Central Marine Fisheries Res. Station,
Mandapam Camp, October 25, 1954.


NEUROSECRETORY CELLS IN PARATELPHUSA HYDRODROMOUS (HERBST)

NEUROSECRETORY cells, i.e., neurones with pronounced glandular activity have recently been discovered in some Decapod Crustacea (Enami, Bliss and Welsh, Knowles, Bliss, Durand and Welsh and Matsumoto). They are described to be endocrine centres in the central nervous system. Their physiological activity has been studied by Bliss in Gecarcinus, Knowles in Leander, Carlisle and Dohrn in Lymnata and Enami in Sesarma.

* A-cell
* B-cell
* C-cell

FIG. 1. Diagram to illustrate the distribution of the neurosecretory cells in the thoracic ganglion of Paratelphusa hydrodromus. (i) Dorsal view, (ii) Ventral view. The position of the C-cells is illustrated only in (ii), but these cells do not occur at the surface. a.c., oesophageal commissure; a.n., neuropiles; a.m., Abdominal nerves.

FIG. 2. Giant neurosecretory cells (A-type) showing the minute dark cytoplasmic granules and axons. Photomicrograph, x 300. Fixation, Susa; Mallory's triple stain. are giant cells corresponding to the A cells of Eriocheir (Matsumoto) but much larger. They measure about 150-60 μ in diameter. Under the phase-contrast microscope, their live cytoplasm shows myriads of tiny granules appearing greyish and a large number of tiny sphere-like bodies somewhat variable in size and appearing black. These granules and spheroids are traceable along the axons. The nucleus is large and rounded with a large nucleolus, the darker bodies of the chromocentres scattered here and there and minute granules. In addition, the