Author is deeply grateful to Dr. M. S. Swaminathan, Director, for his interest in the study. Thanks are due to Sri. R. D. Iyer for his help.

Division of Genetics, Indian Agricultural Research Institute, New Delhi-12, *August* 11, 1966. O. P. GOVILA.

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DISPERSAL OF CHAROPHYTES BY THE PINTAILS

It is well known that ducks feed on the Charophytes and hence it is presumed that these birds help in the endozoic dispersal of these plants.[1,2] The pintails (*Anas acuta* L.) are the winter visitors to the Ambazari lake in Nagpur. These birds were observed feeding on the aquatic vegetation of the lake particularly on the tips of *Chara corallina* Willd. The lake vegetation consisted of *Nitella hyalina* (De Cond.) Ag., *Chara corallina* Willd., *C. zeylanica* Willd., *C brachypus* Br., *Lychnothamnus barbatus* (Meyen) Leonhardi, *Hydrilla* sp., *Naias* sp., and *Vallisneria* sp. The intestinal contents of two birds were found to contain parts of *Chara* plants. The microscopic study of the droppings of these birds revealed that the droppings consisted of crushed parts of the stem, 'leaves', antheridia and oogonia of the *Chara* plants, however, there were also a fairly good number of complete oospores in these droppings. It was therefore thought worthwhile to find out whether these complete oospores present in the droppings are viable or otherwise. For this purpose a good amount of the droppings were mixed with sterilized garden soil and using distilled water was kept in glass bottles. Within a month a number of oospores germinated. Majority of them were found to be of *Chara corallina* and few of *C. zeylanica* and a solitary plant of *Naias minor* Allioni.

The pintails are the migratory birds coming to India from Central Asia.[3] It is therefore quite possible that these birds might be helping in the endozoic dispersal of *Chara corallina* and *C. zeylanica* through their droppings dropped on their ways to and from India.

Botany Department, College of Science, Nagpur-1, *June* 8, 1966. N. D. KAMAT.

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INDUCTION OF ARCHEGONIA IN *POHLIA NUTANS*

Pohlia nutans (Hedw.) Lindb., a common paroicous moss, has been maintained[1] in aseptic cultures for the last ten years. In the beginning, half-strength Knop's nutrient solution was used as a basal medium, but later, a modified Voth's medium[2] has been used for sub-culturing at monthly intervals. During this long period, small masses of protonemal filaments of *P. nutans* from the sub-cultures were used as inocula for various experiments on protonemal growth and bud formation. Until recently, gametangia have not been formed in the leafy shoots of any of the cultures. It appeared, therefore, that the clone was a sterile one. During some recent nutritional studies, however, archegonia, but no antheridia, were found on the leafy shoots (Fig. 1). Results were confirmed by replication of the experiments. Of the modifications of Voth's cation and anion nutrient solutions,[3] only the one in each series which produced the maximum number of gemmæ cups in *Marchantia polymorpha*, supplemented with urea at 0, 5, 10, 15, 25 and 50 mg./l. concentrations, were used. The cultures were

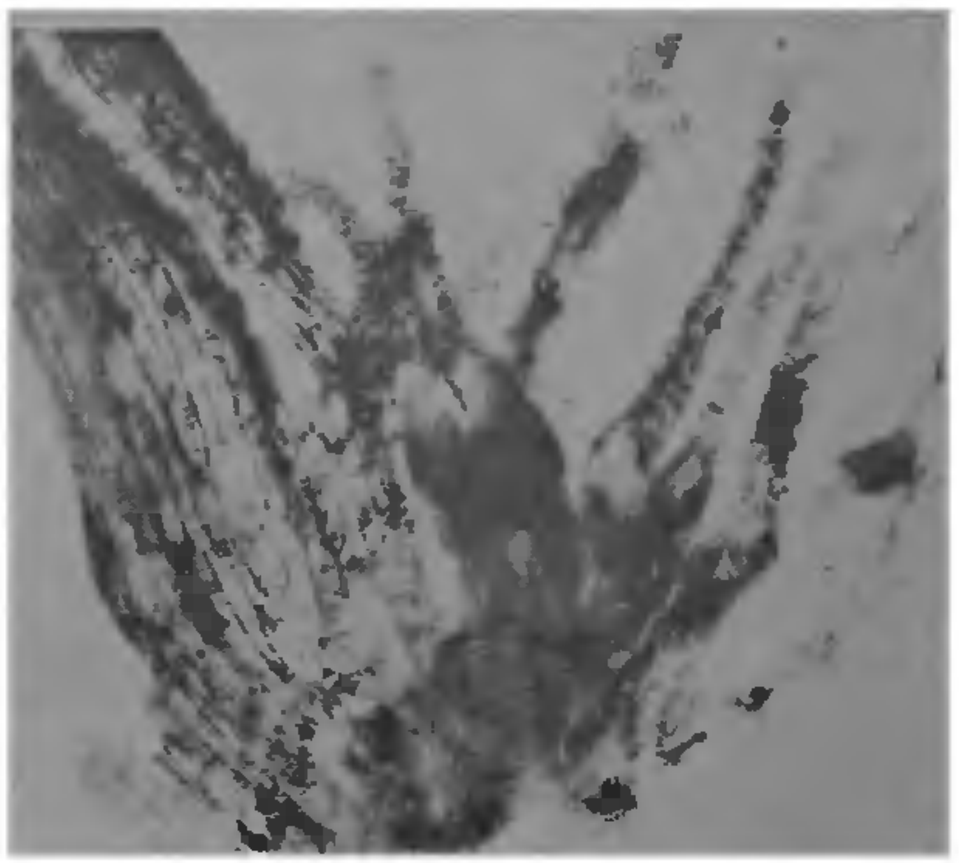

FIG. 1. Induced archegonia in the tip of a shoot of *P. nutans*.

TABLE I

Effects of urea on the formation and development of buds and archegonia when added to two kinds of nutrient solutions

Effects	Concentrations of urea in mg./litre					
	0	5	10	15	25	50
Total No. of buds ..	8, (0)	46, (0)	105, (0)	120, (27)	143, (9)	91, (7)
Per cent. of buds developed into leafy shoots	0, (0)	0, (0)	43, (0)	85, (73)	90, (0)	83, (0)
No. of archegonia per head ..	0, (0)	0, (0)	1–2, (0)	3–4, (rarely 1–2)	3–4, (0)	0, (0)
Per cent. of leafy shoots with archegonia	0, (0)	0, (0)	8, (0)	23, (0)	30, (0)	0, (0)

N.B.—Results were averages of 5 similar nutrient agar cultures of 47 days old. The two series of numbers given in the table—numbers as such and numbers within brackets represent results from *anion* and *cation* series respectively.

kept under the usual regime of light and temperature conditions.[4]

The principal results of the treatments appear in Table I. Archegonia did not appear in plants growing without urea. The occurrence of archegonia and the number per head were highest in the *anion* series with 25 mg./l. of urea.

Archegonia were found in heads containing perichætial leaves which were distinctly larger than the ordinary leaves. The appearance of the perichætial leaves seemed to be a prelude to the appearance of archegonia. There were no marked differences between cultures containing 15 mg./l. and 25 mg./l. of urea ; but, in the treatment containing 50 mg./l. urea, although the leafy shoots developed, archegonia were completely inhibited. In the *anion* series, the number of archegonia per head and their frequency decreased progressively with the progressive decrease in the concentration of the urea. In the *cation* series, containing 15 mg./l. urea only, archegonia were rare and then largely undeveloped. Apart from the wide variation in the induction of archegonia in the *cation* and *anion* series, several alterations in development occurred. These are summarized in Table I.

The results show the graded effect of the different concentrations of urea on the formation of shoot buds, their development into leafy shoots, and the induction of archegonia. It is also clear that the induction of archegonia by urea was limited by the presence of a combination of macro-salts of the *anion* series only, and that the cultural conditions prevented induction of antheridia. It is noteworthy that during this long period of growth of the gametophytes in aseptic culture, the urea factor which favoured the formation of archegonia, or a precursor for their formation, did not change, but was effective only when coincident with the required nutrients and favourable light and temperature conditions. It seems that the sterile moss plants which are found in nature may be sterile because of unfavourable edaphic factors. For reference, Noguchi's[5] observations of the sporulation of two Japanese *Merceya* species (*M. ligulata* and *M. gedeana*) may be stated. He did not find any sporangia in specimens collected from Europe, N. and S. America and Java, but found good sporophytes in specimes from N.W. Himalayas, Formosa and Japan.

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Lucknow (India), *July* 19, 1966.

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