fungus in the seed is an indication of its dreaded and destructive nature. More than that Wallen *et al*[8] observed epiphytotic in Canadian field peas due to *A. pinodes*.

Interception of *A. pinodes* on pea not recorded from India so far and the severe damage it causes are attributed to the fact that pea germplasm should be subjected to rigorous and critical test of seed health to avoid its introduction in the country during quarantine examination. It is also suggested that the pea germplasm should be incubated for 12–14 days instead of a week so that an infection of *A. pinodes* cannot be escaped in infected seeds.

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NITELLA HYALINA F. *HYALINA* (DC.) AG., R.D.W.: A NEW CHROMOSOME COUNT AND ITS CYTOTAXONOMY

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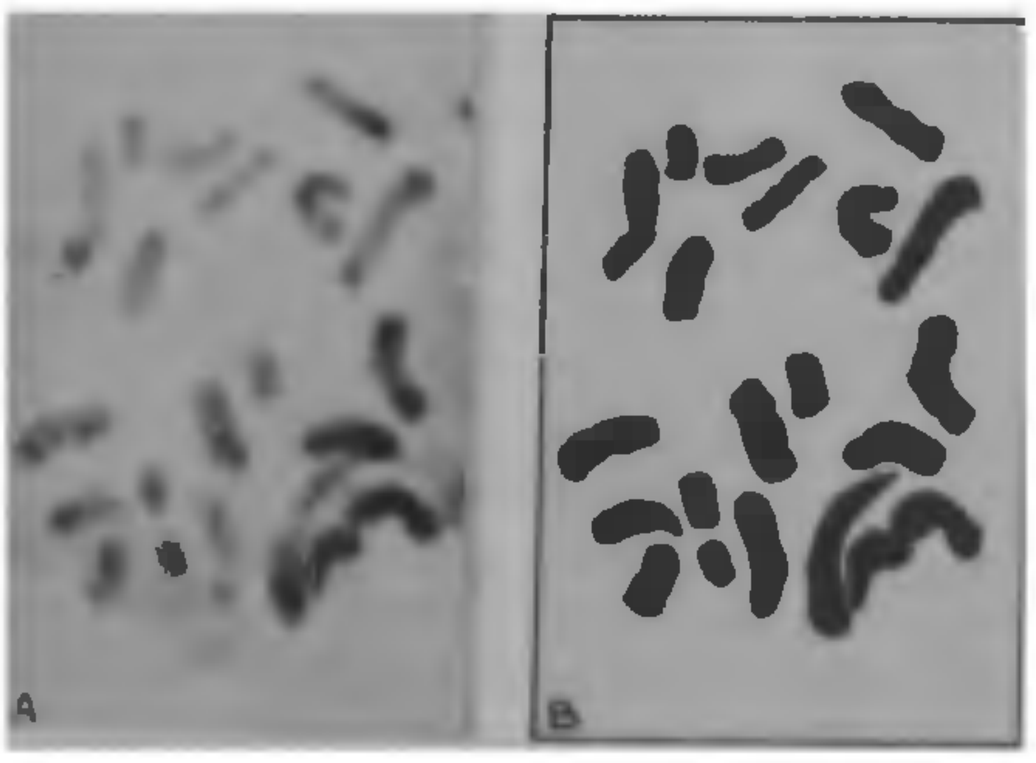
NITELLA HYALINA, an interesting heteroclemous charophyte of subgenus *Tieffallenia*, was collected from Nekpur locality of Bareilly District in December–January, 1978–86 during a cytotaxonomic survey of Rohilkhand charophytes. The taxon was identified[1] as *N. hyalina* f. *hyalina* (Dc.) Ag. R.D.W. and chromosome count of $n = 21$ (figure 1) was recorded for the first time.

Plants were monoecious, 5–21 cm high. Axes 477–596 μm in diameter, Internodes 3 times longer than branchlets. Primary branchlets 4–6, 3(–4) furcate, heteroclemous. Secondary branchlets 13–14, 1–2 furcate. Dactyls 5–7, uniformly 2-celled. Mucilaginous envelope present. Oogonia absent at first free branchlet node, solitary, 416–477 μm long, 256–300 μm wide. Oospore black, 266–340 μm long, 183–256 μm wide. Convolutions 6–9. Antheridia 256–416 μm in diameter.

Chromosome number in *N. hyalina* was determined following techniques worked out earlier[2]. Chromosome morphology of this taxon was studied from antheridial filaments[3–15] and a chromosome count of $n = 21$ (figure 1A and B) was established in it for the first time. Resting nuclei of *N. hyalina* were 11.7–14.9 μm in diameter. Nucleolus 1, 2.3 μm in diameter. Length of chromosomes varied from 1.4 to 6.5 μm and the width was 0.6 to 1.4 μm.

The chromosome numbers reported so far in *N. hyalina* (except $n = 16$ by Gillet[13] and $n = 14$ by Sato[11]) clearly indicate that the taxon has derived from $x = 3$ through polyploidization. Though, all the existing species of *Nitella* appear to evolve from a common ancestor ($x = 3$), Hotchkiss[17] bifurcated the tribe *Nitelleae* into two parts having basic chromosome numbers of 6 and 9 respectively. Sarma *et al*[18] supported this view and named these fractions as anarthrodactylous and arthrodactylous *Nitella*. Ramjee and Bhatnagar[18] refuted this generalization on the basis of $n = 9$ in an anarthrodactylous form of *Nitella mirabilis*.



2000 X

Figure 1A, B. *V. Hyalina* f. *hyalina* (Dc.) Ag. R.D.W. A. Metaphase showing 21 chromosomes. B. Drawing of the same.

Cytological studies in arthrodactylous *N. hyalina*[2,15,18,21], including the present report of $n = 21$ in *N. hyalina* f. *hyalina* do not support the views of Hotchkiss[17] and Sarma *et al*[18] because the chromosomes in this species exhibit direct multiplication of $x = 3$. It is evident from the above discussion that the number of cells per dactyl (arthro and anarthrodactylae) and types of branchlets per whorl (hetero and homoclemae) may be accepted as morphologically distinct groups but cytologically they have a single base number $x = 3$ rather than $x = 6$ or 9 as propounded earlier[17,18]. The present author is of the view that the genus *Nitella* is a direct descendant of charophyte ancestor ($x = 3$) and undergoes a high degree of polyploidization as the intergeneric evolution proceeds in the genus *Nitella*.

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TISSUE CULTURE OF *ARTEMISIA ANNUA* L.—A POTENTIAL SOURCE OF AN ANTIMALARIAL DRUG

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Artemisia annua L., a Chinese medicinal herb, has evoked wide interest for its artemisinin (qinghasu) content which is emerging as an effective antimalarial drug[1]. The drug is present mainly in the leaves[2] (0.01–0.5%). Although a few species of *Artemisia* occur in India, the existence of *A. annua* L. has not been reported from India. Recently Singh *et al*[3] reported this species in the Kashmir valley and in Lucknow from the seeds obtained from the Royal Botanic Gardens, Kew[3]. The plants cultivated in Lucknow showed lower artemisinin content than those grown in Kashmir valley (0.1%). We grew the plants of *A. annua* in Calcutta from the seeds obtained from USA (Courtesy of Dr D. L. Klayman, Walter Reed Army Institute of Research, Washington, USA) and found that the agroclimatic condition of this area is congenial to its luxuriant vegetative growth. However these plants did not set viable seeds. Hence, the present study was undertaken on the tissue culture of *A. annua* to determine the feasibility of employing this technique as an alternate method for its propagation.

Two types of explants were used to initiate tissue cultures: (i) lamina and shoot tips from one-month-old aseptically grown seedlings, and (ii) lamina and petiole from two-month-old field grown plants. Seeds and leaves from field grown plants were surface-sterilized for 10 and 5 min respectively in 0.1% solution of mercuric chloride, rinsed 5 times with sterilized distilled water and cultured on semisolid medium. Murashige and Skoog's (MS) medium[4] but containing thiamine-HCl (1 mg/l), nicotinic acid (1 mg/l) and pyridoxine-HCl (0.5 mg/l) was used as the basal medium. It was jelled with 0.6% agar-agar (bacteriological grade, BDH) and