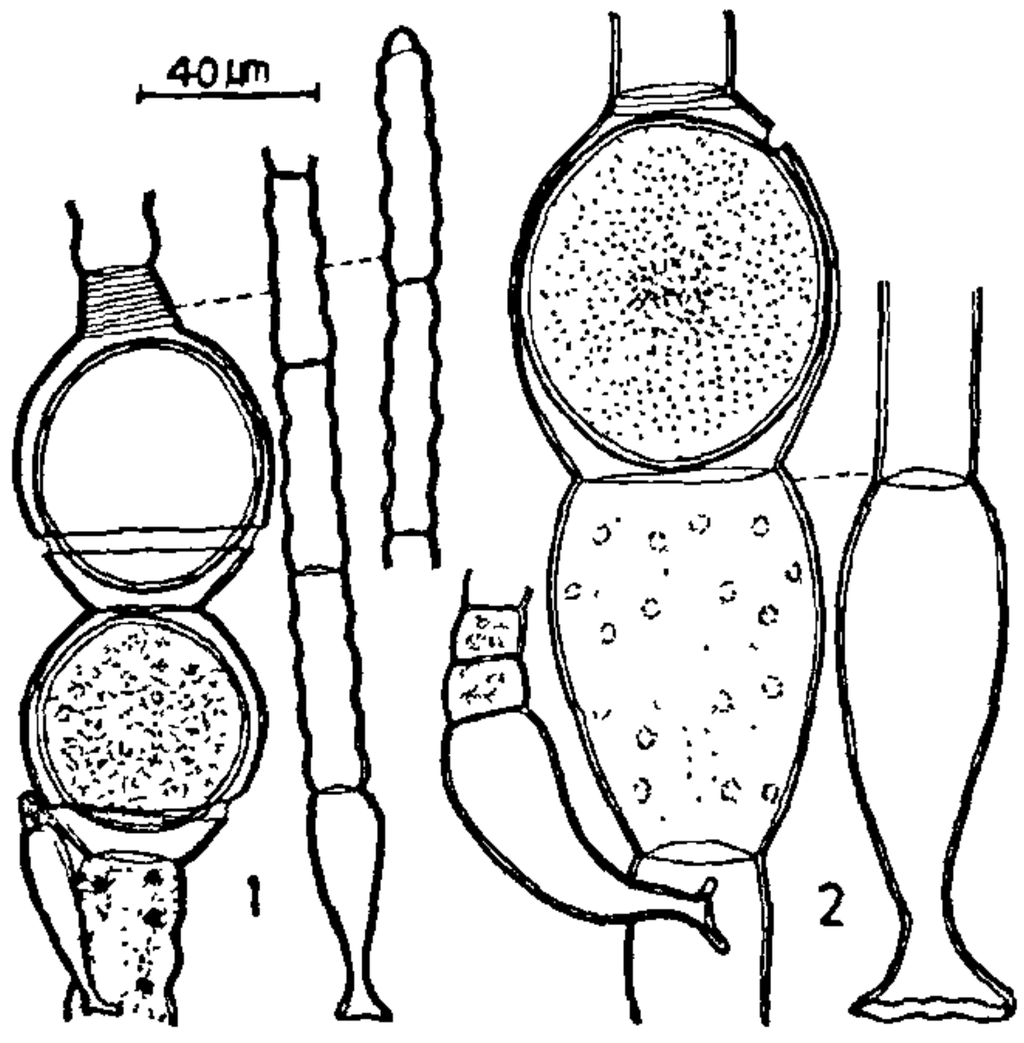
Oedogonium sinuatum (Trans.) Tiffany f. *seriatum* Prescott (figure 1).

Filaments nannandrous, gynandrosporous; vegetative cells undulate and capitellate, undulation up to four, 20–30 μm in diameter, 50–90 μm in length; oogonia single or up to four, seriate, spherical, 60–70 μm in diameter, 50–80 μm in length, operculate, division inferior; oospores spherical, smooth-walled, not completely filling the lumen of the oogonia, 55–60 μm in diameter, 50–60 μm in length; nannandria usually many, up to six, attached with a suffultory cell, 8–10 μm in diameter, 40–50 μm in length; antheridia exterior, two, 8–9 μm in diameter, 9–12 μm in length.

The present specimen agrees well with the type description. However, *O. undulatum* (Wittrock) Hirn and *O. sinuatum* (Trans.) Tiffany are quite similar in general appearance, but both have narrower vegetative cells and oogonia in comparison to the present taxon.

Habitat and collection no.: Epiphytic on *Ceratophyllum demersum*, *Utricularia aurea*, *Nelumbo nucifera* and *Chara zeylanica*; 47, 113.

Occurrence and distribution: August to March; this alga is new for Indian algal flora; earlier reported from N. America[1].



Figures 1 and 2, **1,** *Oedogonium sinuatum* (Trans.) Tiffany f. *seriatum* Prescott. **2,** *Oedogonium westii* (Tiffany *et* Braun) Tiffany.

Oedogonium westii (Tiffany *et* Braun) Tiffany (figure 2).

Filaments nannandrous, gynandrosporus; vegetative cells cylindrical, 15–30 μm in diameter, 70–140 μm in length, suffultory cell inflated, 35–55 μm in diameter, 70–87 μm in length; oogonia two or up to three, seriate, obovoid, 50–64 μm in diameter, 65–85 μm in length, poriferous, pore superior; oospores ovoid to obovoid, smooth-walled and filling the lumen of oogonia, 52–61 μm diameter, 60–75 μm in length; nannandria curved and situated on a suffultory cell, 17–25 μm in diameter, 65–75 μm in length; antheridia single, 15–19 μm in diameter, 10–12 μm in length.

The present specimen resembles the type description in all the essential features.

Habitat and collection no.: Epiphytic on *Ceratophyllum demersum*, *Hydrilla verticillata* and *Eleocharis dulcis*; 123, 191.

Occurrence and distribution: August to December; the present alga is also new to Indian algal taxonomy; previously it was reported from N. America and Europe[1].

25 August 1988; Revised 4 February 1989

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LEAF ANATOMY OF MIDRIBLESS MUTANTS IN PEARL MILLET

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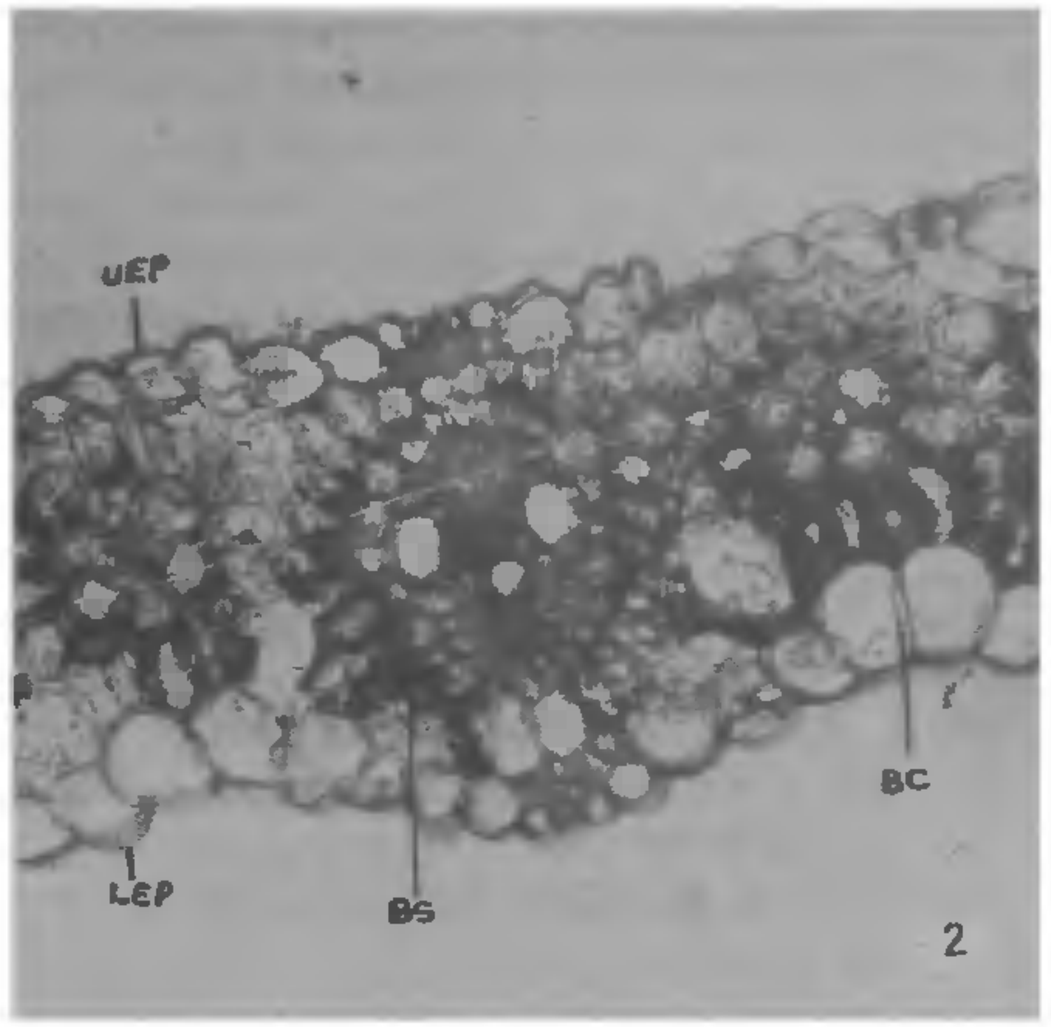
THREE spontaneous midribless mutants in pearl millet [*Pennisetum glaucum* (L.) R. Br., syn. *P. typhoides* (Burm.) S. & H.], two from Mali (IP 6534 and IP 10154) and one from India (J 561), were identified. All the leaves of the midribless mutants characteristically droop in appearance (figure 1) and

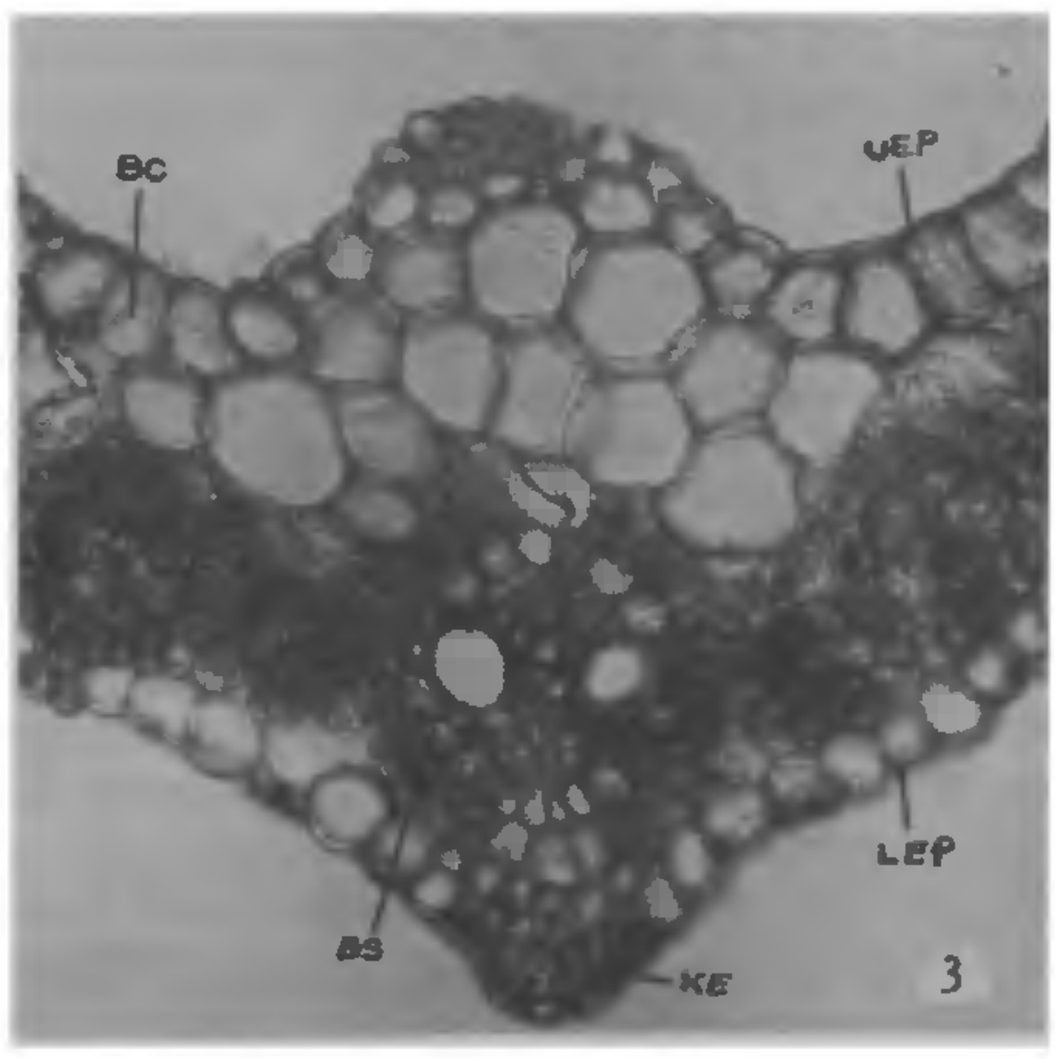
Figure 1. Morphology of the midribless mutant (IP 6534) of pearl millet, showing drooping leaves.

are distinguishable from emergence to maturity[1]. The normal leaf blade has a deep groove on the abaxial side and is curved inwards, while on the adaxial side there is a prominent midrib; in the mutants, both abaxial and adaxial sides are alike, the leaf blades are flat and ribbon-like, and the veins are not so prominent. The anatomical differences observed between the leaves of normal and midribless mutants are reported in this note.

Fresh leaf material of 1-month-old plants was collected and fixed in FPA (40% formalin, propionic acid, and 70% ethyl alcohol, in 5:5:90 proportion by volume). The methods used by Maiti and Bisen[2] for making leaf sections and staining were followed.

In both the normal and the midribless mutants, the epidermis is cuticularized and composed of rectangular to oval-shaped cells. The lower epidermis is entire in outline, but the upper epidermis is wavy and interspersed with zones of bulliform (motar) cells. The midrib in transverse section appears 'semi-lunar'. The main difference observed is that a prominent keel with parenchymatous tissue was present on the abaxial side in the normal leaves but was absent in the mutant (figures 2 and 3). The number of vascular bundles in the leaf was also different in the normal and the mutant plants. In the normal leaves, 5–9 large and 20–30 small vascular bundles were observed, while only one large and 10–15 small vascular bundles were observed in the midribless mutants. The amount of sclerenchymatous tissue associated with large bundles was reduced in the mutant compared to that in the normal. Though two non-allelic genes mrl_1 or mrl_2 control the midribless trait[1], differences in leaf anatomy were not found among them. Vascular bundles in both





Figures 2 and 3. **2,** Transverse section of midribless leaf, showing absence of a prominent keel. **3,** Transverse section of normal leaf, showing prominent keel on the abaxial side. (UEP, Upper epidermis; LEP, lower epidermis; BS, bundle sheath cells; BC, bulliform cells; KE, keel.)

the cases were seen surrounded by two parenchymatous sheaths; this is not a common feature in mesophytic grasses[3]. The cells of the outer sheath are very large in size compared to those of the inner sheath. Mesophyll cells surrounding the vascular bundles are radially arranged.

'Kran z' anatomy, i.e. presence of chloroplasts in

the mesophyll as well as in bundle sheath cells, which is a characteristic feature of C4 plants, was observed in both normal and mutant plants[2]. The absence of a prominent keel and reduced sclerenchymatous tissue on both abaxial and adaxial sides of the large vascular bundle in the midribless mutant cause the leaf to droop.

22 September 1988; Revised 20 February 1989

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NEW REPORT OF WILT DISEASE OF BRINJAL IN INDIA

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DURING the regular disease survey at Mahatma Phule Agricultural University, Rahuri, and Ganeshkhind garden, Pune, an incidence of *Fusarium* wilt was noticed on brinjal (*Solanum melongena* L.) varieties Manjari Gota and Vaishali during 1984–85. The characteristic initial disease symptom under field conditions was sudden wilting of leaves of infected plants. Thereafter, loss of green colour of the foliage and, finally, browning were seen. The disease developed by infection of xylem vessels. The affected leaves showed vein clearing of young leaflets and epinasty of old leaves, followed by general yellowing and defoliation. The wilting started in the lower parts of the plants and spread upwards and was generally observed at flowering stage. Sometimes partial wilting was also observed (figure 1), and the plants wilted completely within 10–12 days. The affected plants showed stunted growth, and when the infected roots were split open, browning of vascular tissues was observed.

Steeketenbug[1] first reported *Fusarium* wilt disease of brinjal caused by *Fusarium oxysporum* f. sp. *melongenae* from the Netherlands. However, Laxminarayana and Reddy[2] reported post-harvest disease of brinjal fruits caused by *F. oxysporum* Schl. from Warangal, India.

Potato, tomato, pigeonpea, chickpea and coriander also appeared to be hosts of this organism[3].

In the present investigation, the causative organism was isolated in pure culture and was identified as *Fusarium oxysporum* f. sp. *melongenae*. The pathogenicity of the fungus was proved by soil inoculation method. Typical wilt symptoms were observed 60 days after transplanting (figure 2), i.e. at flowering stage, and reisolated culture was used for carrying out further studies.

Figure 1. Brinjal, showing partial wilting caused by *Fusarium*.