producing taller plants with more leaves than the R seedlings. In view of these differences the chlorophyll content of seedlings was estimated and as shown in Table I, once again the L seedlings gave higher values. On the basis of the data presented it may be deduced that L seedlings possibly are 'superior' to R seedlings and hence are expected to produce more 'bamboos'. It is therefore suggested that the L and R seedlings be grown separately. The fact that bamboo seedlings are first raised in nursery beds and later transplanted to the field, the suggestion appears practical. Davis[6] showed that R coconut palms give a higher yield of coconuts than the left. In view of the relationship between handedness and yield on the one hand and the very high utility of bamboo in paper industry and the like, the handedness in the Bambuseae in general and the genus *Bambusa* in particular deserve further investigations.

According to Compton[2-4] the dircteion of folding of the first leaf is not inherited. He further states, "the ratio of left handed/right handed is hereditary though right and left handedness are not". This possibly holds true for *Bambusa* but it must be emphasised that it is a difficult material to tackle experimentally in view of its flowering once in its lifetime. The L and R seedlings thus represent stereoisometric forms and hence mirror images and constitute a case of bioisomerism[1].

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SOME FUNGI ASSOCIATED WITH THE ROOT SYSTEM OF COCONUTS IN THE ROOT (WILT) AFFECTED AREA

EXTENSIVE root damage is an important symptom of coconut root (wilt) disease. Menon and Pandalai[6] reported that the root system of affected palms manifested considerable deterioration quantitatively as well as qualitatively. Most of the rootlets and the main roots dry up from their tips backwards In portions from tips of actively growing roots Indira and Ramadasan[3] found internal browning of vascular elements sometimes extending into the cortex in the diseased palms and mild internal browning of tissues of apparently healthy palms growing in diseased soil. Histological studies revealed degenerate phloem. Many healthy looking roots from apparently healthy and diseased palms had fungal hyphae (?) in metaxylem (Govindankutty and Vellaichamy[2]). Radha (personal communication) had observed spores of *Cylindrocarpon* sp. in the metaxylem. Results of attempts to isolate the fungi, associated with similar roots, are reported here.

Root tips, six inches in length, having no external damage, were collected from palms free of visual symptoms of disease. Three-inch portion above the root cap was examined for the presence of internal browning. After surface disinfection this was cut aseptically into thin cross sections using razor blade and plated on coconut root extract agar medium. *Monacrosporium bembicodes* (Dreschler) Subram. (IMI 193424), *Graphium* sp. (IMI 193425), *Fusarium equiseti* (Corda) Sacc. (IMI 193426), *Cylindrocarpon effusum* Bugn. (IMI 193427), *Penicillium spiculisporum* Lehman (IMI 193428) and *Penicillium javanicum* van Beyma (IMI 193429) were isolated from the roots which showed internal browning.

Presence of some of these genera in the root (wilt) affected area bears significance. *Fusarium equiseti* is capable of producing tuber rot in cycas (Subramanyam *et al.*[11]). Superimposed on Cucumber Mosaic Virus infected cucumber *F. equiseti* brought about the death of the plant (Nitzany *et al.*[8]). In this context it is worth mentioning that Shanta and Menon[9] attributed the association of a virus in the coconut root (wilt) disease. Subsequent to root infection by *Cylindrocarpon panacis* on ginseng (Matuo and Miyazawa,[5] and *C. tenue* on coffee (Subramanian and Govindarajan[10]) the plants died after exhibiting foliar symptoms. Significantly, the presence of *C. effusum* is reported here. Occurrence of *Radopholus similis* on coconut root (Koshy *et al.*[4]) necessitates investigation on the mode of spread of *C. effusum* apart from its pathogenic potentialities as Booth and Stover[1] suggested dissemination of *C. musae* by the same nematode. *Monacrosporium*

doedycoides has nematode attracting substances (Monoson *et al.*[7]) Comparable capabilities of *M. bembicodes* can be explored.

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CRITICAL SOIL WATER POTENTIAL AND SEED HYDRATION FOR GERMINATION OF GRAIN SORGHUM

IT has been reported that the occurrence and the rate of germination are considerably influenced by soil moisture matric potential and hydraulic conductivity (Collis–George and Hector[1], Sedgley[7], and Manohar and Hydecker[5]). Peters[6] seported that the seeds of peas, soybean, corn and wheat failed to germinate at or below the wilting coefficient. Doneen and MacGillwray[2] found that the germination of vegetable seeds in sand and soil would depend on its water content. In the present investigation, an attempt has been made to evaluate the critical soil moisture and seed hydration for the germination of various cultivars of sorghum.

The invetigations were conducted on Parbhani clayey soil having pH 8·5, clay 55·2%, field capacity 36%, water holding capacity 62% and permanent wilting point 18%. Four lots of clayey soil (2 mm sieved) were moistened with a fine water spray to bring it to the desired moisture potentials (—15·0, —6·2, —4·2 and —3·0) bar and stored in closed cohtainers for the attainment of equilibrium. Ten healthy seeds of each of the 14 cultivars of sorghum were placed in Petri dishes containing 10 g of the soil at a depth of 10 mm at 28° ± 1° C. The experiment was replicated thrice. The germination was defined when 2 mm long radicle sprouted from the seed coat. The data on germination percentage were analysed statistically.

The data presented in Table I indicate the variation of critical seed hydration of the different varieties of sorghum. These observations suggest that there was a specific seed hydration level for each cultivar below which germination would not occur. This hydration level is governed by the internal water potential of the seed. As the seed imbibes water during the early stages of imbibition, its water potential increases and during the later stages some internal metabolic modifications may occur as was suggested from corn and cotton seed by Hadas and Stibbe[4]. When the seed attains that first 'Critical' hydration level, germination will occur. The seeds of CSH–6 and SPV–86, having lower critical hydration level, showed successful germination at — 6·2 bar soil moisture potential whereas CSH–1 and SPV–101 having similar critical seeds hydration germinated at — 4·2 bar. The seeds of C.S. 3541 having critical hydration similar to the seeds of CSH–1 and SPV–101 germinated at — 6·2 bar soil moisture

TABLE I

Critical soil water potential and seed hydration for germination of several cultivars of grain sorghum

Sr. No.	Cultivars	Time of germination (hours)	Critical soil water potential (bar)	Critical seed hydration (% water)
1.	CSH–5	60	—3·0	34·42
2.	302	52	—4·2	29·55
3.	CSH–8 (R)	56	—4·2	28·49
4.	SPV–97	64	—4·2	28·37
5.	M35–1	56	—4·2	26·96
6.	SPV–99	68	—4·2	26·66
7.	CSH–1	64	—3·0	25·86
8.	R–16	64	—6·2	25·00
9.	370	64	—6·2	23·44
10.	SPV–101	64	—4·2	22·72
11.	C.S. 3541	64	—6·2	22·58
12.	CSH–4	68	—4·2	22·52
13.	SPV–86	56*	—6·2	21·57
14.	CSH–6	64	—6·2	21·07