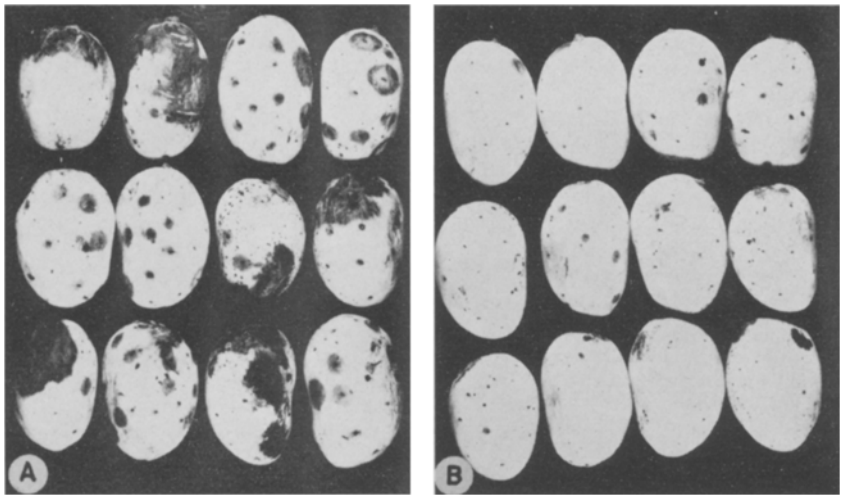

Inoculated mango fruits after 8 days of storage. *A* Untreated fruits. *B* Fruits given pre-inoculation dip in Lycopodium clavatum potency 190.

3 replicates were taken for each treatment and the mean value of the replicates was recorded. Percentage spore germination was recorded after an incubation of 8–12 h.

The drugs which completely inhibited the spore germination in vitro, were screened for their efficacy in checking the fruit rot. For this purpose, healthy mango fruits, just ripe, var. 'Dasheri', were employed. Both pre- and post-inoculation treatments were given to the fruits. The fruits after disinfection were injured with sterilized needle. The inoculum was provided in the form of spore suspension and the inoculated fruits were incubated for 24 h. Dip treatments were given to the fruits for 3–5 min in each drug and the treated fruits were stored in glass chambers at 24 °C (±1 °C). For pre-inoculation treatment, the injured fruits were dipped in each drug prior to inoculation. In the control series, the inoculated fruits were dipped in sterilized distilled water instead of a drug. In all cases, 5 replicates of 12 fruits each were taken and the percentage fruit infected and percentage rot developed were determined after 8 days.

Results and discussion. Effect of drugs on the spore germination of the fungus indicated that Phosphorus potency 50, Lycopodium clavatum potency 190, Asvagandh potency 100, Arsenicum album potencies 1, 89 and 90 and Zincum sulphuricum potencies 1 and 2 completely inhibited the spore germination. Other drugs either did not affect or only reduced the percentage of spore germination. Thus, only those drugs which completely inhibited the spore germination were evaluated for their efficacy in checking the fruit rot.

The results presented in the table indicate that, except for Lycopodium clavatum potency 190, none of the drugs tested could reduce the percentage of fruit infected. They further indicate that, although all the inhibitory potencies reduced the percentage rot, Lycopodium clavatum potency 190 was found to be most effective in both the types of treatment. Thus only Lycopodium clavatum potency 190 was effective both in reducing the percentage fruit infection as well as percentage rot (figure). Detail studies dealing with the analysis of the extracts of treated fruits with Lycopodium clavatum potency 190 showed that the drug did not induce any change in amino acid, amide, organic acid, sugar and vitamin C contents of the fruits. On the basis of the above results, Lycopodium clavatum potency 190 may be safely recommended for the control of mango fruit rot caused by *P. mangiferae*.

1 The authors express their grateful thanks to Prof. D.D. Pant, Head of Botany Department for providing laboratory facilities, and to Council of Scientific and Industrial Research, Government of India, New Delhi, for financial assistance.

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Occurrence of foliar leaves on long shoots of *Pinus*

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Summary. At Bundi (Rajasthan, India), a *Pinus roxburghii* tree has been observed to develop green, needle-like, spirally-arranged, elongated, foliar leaves on long shoots. Such foliar leaves are not reported on *Pinus* plants except at the seedling stage.

We have come across a cultivated *Pinus roxburghii* Sarg. tree, growing at Bundi (Rajasthan, India). It is more than 30 years old and has attained a height of about 7 m and a girth of 98 cm. It does not exhibit the normal excurrent habit and bears green, needle-like, spirally-arranged, elongated, foliar leaves on the long shoots (figures 1 and 2).

In gymnosperms, generally both scale leaves and foliar leaves are found on long shoots[2,3,5]. However, in 2 gymnospermic genera, namely *Pinus* and *Sciadopitys,* only scale leaves are found on the long shoots, i.e. long shoots are devoid of any foliar leaf[2–5]. Even in these genera, though, such foliar leaves on long shoots are reported on the

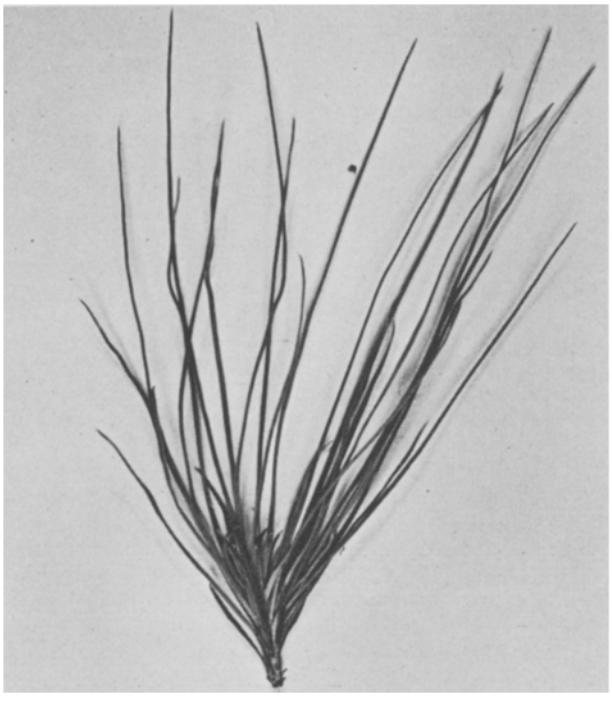

Fig. 1. A number of foliar leaves produced on a young long shoot of *Pinus roxburghii* (actual size).

Fig. 2. A number of foliar leaves and a dwarf shoot produced on an old long shoot of *Pinus roxburghii* (1/3 actual size).

seedlings[2-5]. It is reported[5] that as a *Pinus* seedling continues to develop, the later-formed foliar leaves on the main axis become progressively smaller and pass over gradually into the scale leaves of the mature stem. With our finding of the occurrence of green, needle-like, spirally-arranged, elongated, foliar leaves on long shoots of the adult plant, this *Pinus roxburghii* tree resembles the majority of gymnosperms.

These foliar leaves start developing on long shoots in early winter. They are elongated, measuring up to 10 cm, and are dull green with a bluish tinge in contrast to the needle leaves which are shining green. These leaves on long shoots have a slightly flattened base which gradually taper to the apex; sometimes, they are spirally twisted in bunches. Dwarf shoots arise in the axils of these green leaves. With the onset of hot weather in the month of April, when temperature shoots up to about 40 °C, they start drying, turn brown and then fall from the trees, leaving persistent leaf bases on the long shoots. Male cones develop quite profusely on this tree, but female cones have not been observed.

It appears that the general climate of the locality, which is very hot, is not congenial for the normal growth of the tree. Throughout the year, the temperature at Bundi is much higher than that of the usual habitat of this plant. During summer, it may reach up to 47 °C. The hot climate may be responsible for this abnormality. Possibly, this represents the reappearance of a character which is said to have been lost with the evolution of this plant[4].

1 Grateful thanks to Dr Elbert L. Little of the US Department of Agriculture (Forest Service) for suggestions.

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High-affinity binding of β-alanine to cerebral synaptosomes might involve glycine-receptors[1]

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Summary. High-affinity, Na^+-independent binding of β-alanine to a synaptosomal fraction of rat brain was potently inhibited by glycine and by some other α-amino acids, but not by taurine or GABA. This binding mechanism, which was also sensitive to both bicuculline and strychnine, might involve synaptic receptors for both β-alanine and glycine.

β-Alanine, like GABA, glycine and taurine, meets most established criteria for the identification of mammalian CNS inhibitory neurotransmitters[3,4]. Its potent neuronal depressant action in vivo is antagonized by both strychnine and bicuculline in the thalamus and cerebral, hippocampal and cerebellar cortices[5,6]. β-Alanine is bound to synaptosome-enriched fractions of mammalian CNS tissues by Na^+-dependent, 'high-affinity' ($K_B \cong 5 \times 10^{-5}$ M) mechanisms[7,8] and by Na^+-independent, 'high-affinity' ($K_B \cong 5 \times 10^{-8}$ M), strychnine-sensitive mechanisms which could