TABLE I

Frequencies of ABO blood groups and the three alleles in different caste groups

Caste group	No. of persons studied		Frequency of A	B	O	AB	Allele frequency p(A)	q(B)	r(O)
Hindus	499	Obs.	0·20	0·42	0·30	0·08	0·15	0·30	0·55
		Exp.	0·19	0·42	0·30	0·09			
Non-Jat Sikhs	264	Obs.	0·20	0·36	0·34	0·10	0·15	0·26	0·
		Exp.	0·20	0·37	0·35	0·08			
Jat Sikhs	478	Obs.	0·29	0·32	0·34	0·05	0·20	0·21	0·58
		Exp.	0·28	0·29	0·35	0·08			
Others	434	Obs.	0·21	0·41	0·30	0·08	0·16	0·29	0·55
		Exp.	0·20	0·41	0·30	0·09			
Pooled	1675	Obs.	0·23	0·38	0·32	0·07	0·17	0·26	0·57
		Exp.	0·22	0·36	0·33	0·09			

mating within sub-groups, the consequence is genetic differentiation. Differences in gene frequencies of Jat Sikhs may be due to genetic isolation from the rest of the population because of their restricted marriages with other two groups or it could also be due to their different ethnic affiliations. The origin of Jat Sikhs is not very clearly understood and there are conflicting views whether they belong to the old settlers in this region or represent a later wave of immigrants[6]. More studies of similar nature may be helpful in resolving this further.

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USEFULNESS AND LIMITATION OF KETOLACTOSE TEST TO DISTINGUISH AGROBACTERIA FROM RHIZOBIA

Agrobacterium radiobacter is a common contaminant with rhizobia during routine isolations of the latter from root nodules of leguminous plants and is morphologically indistinguishable from *Rhizobium* on yeast extract mannitol agar. Bernaerts and De Ley[1] proposed a biochemical test to distinguish *Agrobacterium tumefaciens* and *A. radiobacter* from other bacteria by the formation of 3-ketolactose on a lactose containing medium, detectable as a yellow ring of precipitate of CuO_2 around the growth of *A. tumefaciens* and *A. radiobacter* when plates were flooded with Benedict's reagent. Clark[2] applied the above test to strains of different species of *Agrobacterium* and *Rhizobium trifolii* and found that *A. radiobacter* and *A. rhizogenes* were positive to this test while strains of *A. tumefaciens, A. rubi, A. pseudotsugae* and *Rhizobium trifolii* were negative. However, further confirmation on the ketolactose test using large number of *Rhizobium* isolates, especially from tropics, is lacking. With this objective, 146 isolates of bacteria from root nodules of several varieties of gram (*Cicer arietinum* L.) and dhaincha [*Sesbania bispinosa* (Jacq.) W. F. Wight] were tested for ketolactase enzyme production. For comparison, seven isolates of *Cicer* rhizobia obtained from recognised laboratories from abroad were also included in this study. A modified medium of Bernaerts and De Ley[1] of the following composition (g/100 ml) was used for growing the nodule bacteria—lactose, 1·0; yeast extract Difco,

0·1; K_2HPO_4, 0·05; $MgSO_4.7H_2O$, 0·08; NaCl, 0·02; $FeCl_3$, 0·001 and agar, 2·0; pH adjusted to 7·2. Each isolate was inoculated to petri plates by depositing a mass of bacterial cells with a loop in the centre of the petri plates as done by earlier workers[1-2]. The plates were incubated for 10 days at 28° C followed by flooding the plates with Benedict's reagent for sixty minutes at room temperature. Simultaneously, nodulation tests were done in sand culture in pots and on agar slopes in test tubes[3-4].

TABLE I

3 ketolactose production and nodulation tests by nodule bacteria

Bacterial isolates from nodules	Number of isolates		
	Tested	3-keto-lactose negative	3-keto-lactose positive
Cicer arietinum			
Nodulating isolates	114	114	Nil
Non-nodulating isolates	16	11	5
Sesbania bispinosa			
Nodulating isolates	12	12	Nil
Non-nodulating isclates	4	1	3

The results (Table I) confirm the earlier observations that *Rhizobium* is negative to ketolactose test. However, it was also observed that some isolates which were positive to ketolactose test could not nodulate the roots of host plants. Nevertheless, some of the non-nodulating isolates, which grew incidentally faster than the nodulating ones on this medium, were found to be ketolactose negative whose identity could not be made out by applying the present test. Therefore, the ketolactose test may be useful in helping to distinguish agrobacteria from rhizobia for routine screening but the final proof for the identity of *Rhizobium* must rest with its ability to form nodules on roots of homologous hosts.

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IS *ACROSTICHUM AUREUM* L. TRULY A MANGROVE FERN?

ALTHOUGH most of the plants of Indian shores are more or less known relatively little attempt seems to have been made so far to evaluate their niche, breadth, and overlap along the shore or the plant communities into which they are grouped in relation to ecological factors. The data, accrued on these aspects, would be of considerable help for a better understanding of their exact ecological status.

Acrostichum aureum is a pantropical gregariously growing coastal fern on landward mangrove swamps, or sea fronted strand areas in the absence of mangroves, or salt water creeks, or on wet lands which have been cut off from the sea. The occurrence of this fern is recorded throughout the Malayan archipelago, Philippines and also in the Andaman and the Nicobar group of islands in association with Nypa formation. In Malaya[1] it abundantly occurs in brackish water swamps up to 700 m from the sea level and in Philippines[4] on salty hot springs. While describing the ecology of ferns of Singapore island[2] it is observed that this fern although it cannot stand too much salty water is conspicuously found towards the landward side and also on raised bunds in mangrove regions. In India the growth of this fern is seen on the tidal estuarine river banks of Sunderbans of the Gangetic delta in West Bengal, the estuarine complex in between the Devi and the Dhamra rivers of the Cuttack District in Orissa State and along the Kerala and Mysore coasts up to Karwar, which represents its north-western limit of extension[5-7]. Thus, its distribution coincides only with the subhumid or perhumid areas of the coast of this subcontinent.

During collection of this fern in India it was noticed that this plant rarely extends into the inland areas. However, its growth in freshwater river banks of Kerala, especially along the banks of Muvathupuzha river in between Vaikom and Kottayam, was observed (N. C. Nair 40296, 40721 CAL). Its inland occurrence is reported from Africa[3] and Malayan archipelago[1]. Recently, this fern was found growing in patches on the exposed sea in front of the Varkala cliffs in the Kerala State. Thus it is evident that this fern, while characteristic of outward mangrove habitat, grows on a varied range of habitats including freshwater sources, saline creeks, swampy estuarine borders[6] and elevated sandy areas. Hence it was thought worthwhile to examine the soil where this fern occurs to evaluate its exact ecological status.

Soil samples were collected from different places and their analyses are shown in Table I. The