In the absence of actual specimens of Abbott's light and dark races the three types met with in Bihar red rot flora cannot be designated in terms of Abbott's descriptions but Types A and C seem to answer closely to the light and dark races respectively except that the former does not appear to produce abundant pink masses of conidia. The culture sent by Dr. Mundkur to America for comparison belonged to the dark race accerding to Abbott.[1]

A preliminary test was conducted to see whether the morphologic differences noticed could be correlated with physiologic differences also. The rates of spread of the two races in 3-eye setts of four varieties, Co 213, 299, 421 and B. 04 were taken as a basis. The setts were inoculated in the middle internode with 8 days' old cultures of Types A and B and kept at room temperature (30–32° C.) for a fortnight. The length of spread was measured and it was found that the linear spread was equal on both sides of the point of inoculation. The organism spread along the entire width in all cases and hence this feature was not taken into account for measuring the index of virulence.

The index was arrived at by dividing the length of the sett by the length of the spread of the organism. The average spread is tabulated below.

TABLE I

Variety	Index of Virulence	
	Type A	Type B
Co 213	3·71	1·96
Co 299	1·49	2·52
Co 421	2·08	2·95
B. 0·4	1·37	4·35

The two races appear to vary as regards their rate of spread within the sett and the variety of the host also influences the rate of spread. This index of virulence, however, is not an indication of the varietal susceptibility which should also take into account the entry of the parasite.

The relation between the specialisation exhibited by *Colletotrichum falcatum* Went and the epidemic outbreak of red rot in North Bihar is under investigation.

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August 18, 1940.

[1] Abbott. E. V., *Tech. Bul.*, 641, *U. S. Dept. Agri.*, 1938.

[2] Ridgway, R., *Colour Standards and Colour Nomenclature*, Washington, 1912.

PRODUCTION OF FRUIT-BODIES OF *AGARICEUS POLYPORUS* BERK. IN ARTIFICIAL CULTURE

Polyporus agariceus Berk. is a saprophyte, usually growing on prostrate logs or dead branches. Bose[1] reported it from Barkuda Islands, Orissa with *P. arcularius* (Batsch) Fries and *Favolus ciliaris* Mont. given as synonyms. The species has been collected from Darjeeling (Hooker f.), Mussoorie (Gollan), Ceylon and several other parts of the world. Though of rare occurrence, it has also been collected on several occasions from Behala, Ballygunj and Shyambazar in the suburbs of Calcutta (Bose, Banerjee).

While making an extensive cultural study of some of the wood-rotting fungi common in Bengal, a fresh sporophore of *Polyporus agariceus* was collected in October, 1940, from Shyambazar, Calcutta, growing saprophytically on logs of *Shorea robusta* (sal). Spore-deposits were taken immediately on sterile agar plates from which several polyporus cultures were made in potato-dextrose agar and kept under different conditions of light and temperature. In all cases germination of spores started within 24 hours.

On the 10th day of inoculation the whole surface of the slant was covered with a felty growth which condensed irregularly making

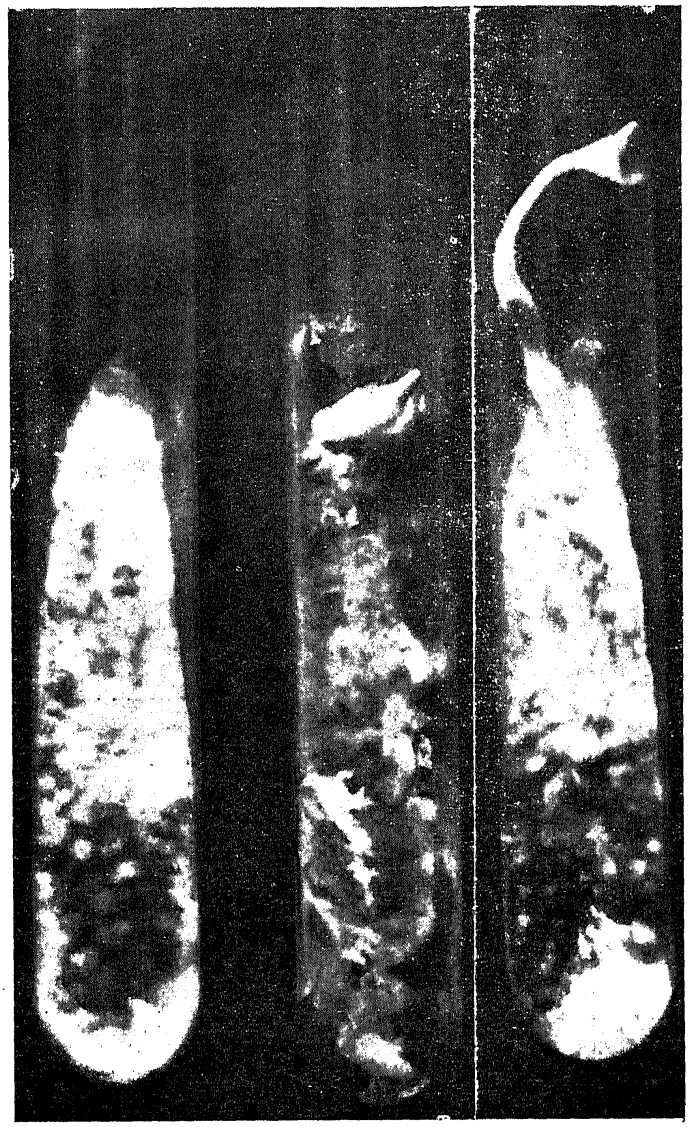

FIG. 1. Cultures showing gradual development of the fruit-body of *P. agaricens* Berk. (Nat. size)

FIG. 2. Pileus magnified to show the pore-mouths

the surface of the slant uneven. The condensed portion became light cinnamon drab to cinnamon drab in colour (Ridgways's Color Standards and Color Nomenclature). The first culture took 23 days to fructify at room temperature and in diffused light, but in subsequent subcultures under the same conditions the period was reduced to one week only. A total period of 4 to 10 days was required for the complete development of the fructifications. It first appears as a small protuberance which goes on growing in length for about 3 to 9 days and terminates in a distinct flattened knob which ultimately expands to form a typical, small, yellowish-brown, umbilicate pileus during the next 24 hours. The margin of the fully expanded pileus is densely clothed with very minute hairs. Pore-mouths, though small, are distinctly hexagonal and slightly projected. Sections of pore-tube show well-developed hymenium with clavate basidia (about 12 to $17\mu \times 3$ to 4μ) each with 4 long sterigmata terminated by white, oval spores (about 6 to $8\mu \times 2$ to 3μ).

Similar fructifications were also obtained on the same medium when sub-cultures were kept in a cold room (22° C.) in diffused light within 14 days after inoculation.

In all cases it was observed that the stalk of the sporophore was negatively geotropic during its growth but became positively phototropic after the formation of the flattened knob. The phototropic curvature of the stipe takes place a little below the pileus. In complete darkness the fungus fructifies but the rate of elongation as well as the length of the stipe is greatly increased and the size of the pileus is slightly reduced.

Detailed cultural studies are now in progress, the results of which will be communicated elsewhere.

The work has been conducted under the guidance of Mr. S. N. Banerjee and is still being continued. My sincerest thanks are due to him for this. I also take this opportunity in expressing my indebtedness to Prof. S. P. Agharkar for his kindness in affording me

facilities in various ways during the progress of this investigation.

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December 4, 1940.

[1] Bose, S. R., *Polyporaceae of Bengal*, **9** ; *Jr. Dept. Sc. C. U.*, **9**, p. 36.

CHROMOSOMES OF *RICCIA HIMALAYENSIS* St. (Ms.)

STUDY of the differentiation of sex in plants and animals has always fascinated biologists to look for deeper causes underlying this great morphological fact; and, one of the most widely accepted explanations of this phenomenon is the sex-chromosome mechanism. Towards the beginning of the present century the sex-chromosome was discovered in animals, particularly in the Insecta, by workers like McClung[1] (1902), Wilson[2] (1904) and others; but not till 1917 was it found in plants, when Allen[3] (1917) first discovered it in a Bryophyte, *Sphœrocarpus donnellii*. Subsequent researches showed that it occurs in plants belonging to other groups also, *e.g.*, in *Rumex*, *Humulus*, *Cannabis*, etc. Many bryophytic genera were also investigated with a hope of finding it in them, and it was found in some of them too, *e.g.*, in *Pallavicinia*; but with the growing mass of information about the cytology of liverworts, it became evident that a heteromorphic chromosome as one finds in *Sphœrocarpus* is not of universal occurrence in them. For example Showalter[4] (1921) did not find it at all in *Conocephalus*; whereas the reports regarding its occurrence in species of *Riccia* like *R. Curtisii*[5] or *R. Bischoffi* were conflicting.

A careful consideration of the various Indian liverworts described by the late Prof. Kashyap[6] (1915, 1916, 1929, 1932) does suggest a possibility of finding a sex-chromosome in some of them at least; but unfortunately our knowledge of the cytology of these forms, except perhaps that of the Codoniaceæ worked out by Mehra[7] (1938), is very meagre. Even the commonest genera like *Riccia* or *Marchantia* have not been worked out thoroughly. An investigation, therefore, of some of the species of *Riccia* found in this part of the country was undertaken and the results obtained in one of them, namely, *Riccia himalayensis*,[8] are given below.

FIG. 1

Riccia himalayensis St. (Ms.). ⅔ Natural size

The material for the present investigation was collected in the vicinity of Ahmedabad and Poona and fixed in Allen-Bouin, Flemming's strong fluid, Navaschin's and other fixatives. It was cut by the usual paraffin or Dioxane method and stained with Heidenhain's Hæmatoxylin. Many clear equatorial plates were obtained in the cells of young developing antheridia and some in the meristematic cells on the dorsal surface near the growing point of the thallus, but not in the cells undergoing sporogenesis. This is largely due to the fact that the spore-mother-cells undergoing tetrad divisions are full of oil globules and granular cytoplasm which render the achromatic spindle obscure; and this has been the experience of many other workers also.[9]

Fig. 1 is a photograph of the plants the chromosomes of which have been determined and are shown in Fig. 2. Fig. 2 *a* and *b* show them in antherids and Fig. 2 *c* shows them in a meristematic cell of the thallus cut slightly obliquely. It is evident that there are eight chromosomes in the haploid nucleus of the species. Seven of them are slender, elongated, not straight, but bent in crooked forms and