From Fig. 2, it is seen that in terms of optical density at 660 mμ, the final yield of the alga at the end of 12 days was significantly increased in all the series to which undiluted fungal extracts were added, indicating the presence of some substance(s) in the fungal mat which accelerates remarkably the growth of *Nostoc*. With the acid extract, the optical density was about five times more than the control and about twice as that with the alcoholic and aqueous extracts. The effective substance(s) seems to be thermolabile and more readily soluble in aqueous acid than in alcohol or water. The culture filtrate of this fungus has, however, been shown to inhibit the growth of rhizobia.[3]

The present investigation indicates that this fungus contains some substance(s) which is readily metabolised by the alga. Further work on the interaction between various algæ and fungi will show whether there exists a beneficial microbiocœnosis among these organisms in the soil. With the instances of lichens, such a possibility cannot, however, be ruled out.

The helpful discussions of Drs. W. V. B. Sundara Rao and N. S. Subba Rao are gratefully acknowledged. We are also thankful to Dr. B. P. Pal, Director, for his interest and encouragement.

Algæ Section, S. K. GOYAL.
Division of Microbiology, G. S. VENKATARAMAN.
Indian Agric. Res. Inst.,
New Delhi-12, *September* 25, 1964.

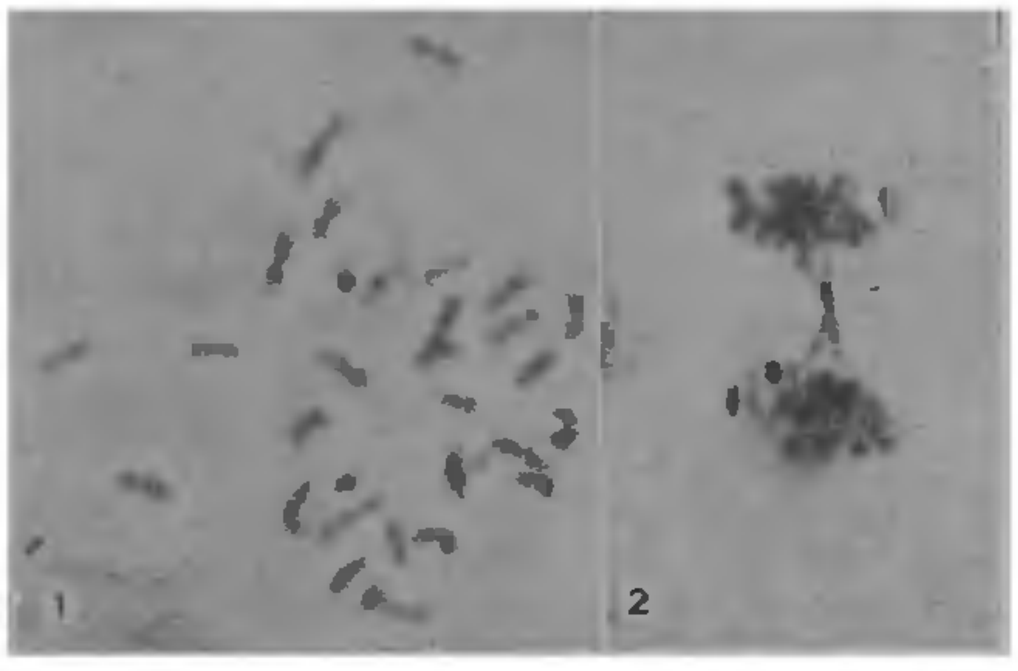
1. Bhaskaran, S. and Venkataraman, G. S., *Nature*, 1958, **181**, 277.
2. Fogg, G. E., *J. Exptl. biol.*, 1942, **19**, 17.
3. Subba Rao, N. S. and Vasantha, P., *Naturwissenschaften* (in press).
4. Venkataraman, G. S., *Proc. Symp. Algology*, 1960, p. 119.

A NATURALLY OCCURRING DICENTRIC CHROMOSOME IN *ELEUSINE CORACANA* (LINN.) GAERT.

CHROMOSOMES with two centromeres are known as dicentric chromosomes. They commonly occur after breakage and reunion in chromosomes following irradiation or a treatment with some radioactive substance. Darlington and Wylie[1] classified the known dicentrics as induced or spontaneous with three categories of behaviour: temporary, permanent, and persistent. The dicentric chromosomes described here in *Eleusine coracana* are spontaneous and temporary.

Eleusine coracana, the Finger Millet, is widely cultivated for fodder and human consumption in India, Africa and parts of Asia, especially in Malaya and China. Seeds were obtained from Patna (India) and Uganda, Samaru (Nigeria). Local seeds were three to four years old. Young root tips of seedlings and young anthers were used for chromosome studies. The Feulgen squash technique was used for staining the chromosomes.

In root-tips $2n = 36$ chromosomes was observed in the seeds grown from Uganda. In the local material, the chromosome number varied from 30 to 36 per cell in one and the same root-tip (Fig. 1; *see* Table I). This observation was made on several root-tips. About 15·6% of anaphase plates showed 1 to 3 chromosome fragments and 32·5% of anaphases showed "Bridges", single, double (Fig. 2) or



FIGS. 1–2. Fig. 1. Mitotic metaphase from root-tip showing 32 chromosomes, × 1,150. Fig. 2. Two dicentric chromosomes are seen at anaphase as bridges, × 2,166.

triple, sometimes with fragments. The percentages of the higher numbers of chromosomes increase with the age of the seedlings, ending in the recovery of a normal chromosome number $2n = 36$. Secondary and tertiary root-tips when examined were found to have a normal set of 36 chromosomes. The meiotic division appears normal, with 18 bivalents at diakinesis and metaphase I. Sometimes some bivalents were seen lagging at anaphase I, but their separation was ultimately complete.

It appears from Table I that the percentages of even numbers of chromosomes are higher than the odd numbers. Presumably both atypical numbers are the result of the formation of

TABLE I

Variation in chromosome number in four root-tips, fixed 4, 5, 8 and 9 days after sowing

Chromosome Number	Percentage of cells			
	4 days	5 days	8 days	9 days
30	23·4	19·0	18·6	14·7
31	4·4	4·07	2·3	0·0
32	30·3	24·2	23·2	14·4
33	6·2	5·7	5·1	4·4
34	28·1	33·8	36·3	44·1
35	1·4	1·1	0·8	0·0
36	7·0	12·1	13·9	22·1

bridges, leading to subsequent loss either of fragments or whole chromosomes and cells which have lost only one chromosome are less viable than those which lost two. Possibly two chromosomes are more often lost together than one only ; or at times a fragment might be counted as one chromosome in metaphase plate.

The diminution in chromosome number in mitotic metaphase is due to the loss of dicentric chromosomes as bridges at anaphase and the cells with less number of chromosomes (minus bridges) take part in further division which also eventually get behind in competition with cells with more number of chromosomes or normal set of chromosomes. The percentage of odd number of chromosomes at metaphase is quite consistent with the percentage of fragments found at anaphase plate.

The occurrence of dicentric chromosomes has also been described in various other species by different authors.[1-7] Regarding the origin of the spontaneous dicentric chromosomes different scientists have suggested different theories. In the present material the dicentric may presumably originate by high temperature and longer period of storage of seeds at which the chromosomes break and rejoin with each other or between its chromatids. However, the abnormalities are conditioned by the treatment of the seeds between collection and sowing.

My thanks are due to Mr. W. H. Foster, Regional Research Station, Samaru, Nigeria, for supply of seed, and to Prof. R. P. Roy and Dr. A. S. Yadav for their encouragement.

Botany Department, D. N. SINGH.
Science College, Patna-5, *Sept.* 24, 1964.

1. Darlington, C. D. and Wylie, A. P., *Heredity*, 1953, **6**, 197.
2. Hair, J. B., *Ibid.*, 1953, **6**, 215.
3. McClintock, B., *Geretics*, 1941, **26**, 234.
4. —, *Cold Spring Harb. Symp. Quqrt. Bio.*, 1941, **9**, 72.
5. Morrison, J. W., *Canad. Jour. Bot.*, 1954, **32**, 491.
6. —, *Science*, 1955, **121**, 604.
7. Sears, E. R. and Camara, A., *Genetics*, 1952, **37**, 125

CERCOSPORA PLUCHEA-TOMENTOSAE SP. NOV. ON *PLUCHEA TOMENTOSA* DC. IN INDIA

SEVERE leaf-spotting of *Pluchea tomentosa* DC. has been observed at the Allen forest in January 1964 and later at Kalyanpur in Kanpur District in August, 1964. The disease starts on the leaf as minute brownish spots which are also found on the stem in the advanced stage of the disease. The leaf spots are amphigenous, circular to irregular, 1–5 mm. in diameter, pale pinkish buff on the upper surface and olive brown on the lower surface. Sporulation is amphigenous but it is more on the lower surface than on the upper surface of the leaves.

Morphology of the fungus.—Stroma globular to somewhat irregular, dark brown in colour, 10·8 to 25·9 μ diam. ; conidiophores in fascicles of 3–11 or more, 2–6 septate, 2–5 geniculate, tip sub-truncate, straight to mildly curved, Prout's brown to mars brown in colour with cinnamon buff contents, 53·9–129·5 × 4·3–6·4 μ in size, mostly emerging through epidermal cells ; conidia hyaline, acicular, base obconically truncate, tip round to sub-acute, 2–7 septate, straight to slightly curved, not constricted at the septum, 12·9–86·3 × 2·1–4·3 μ in size (Fig. 1).

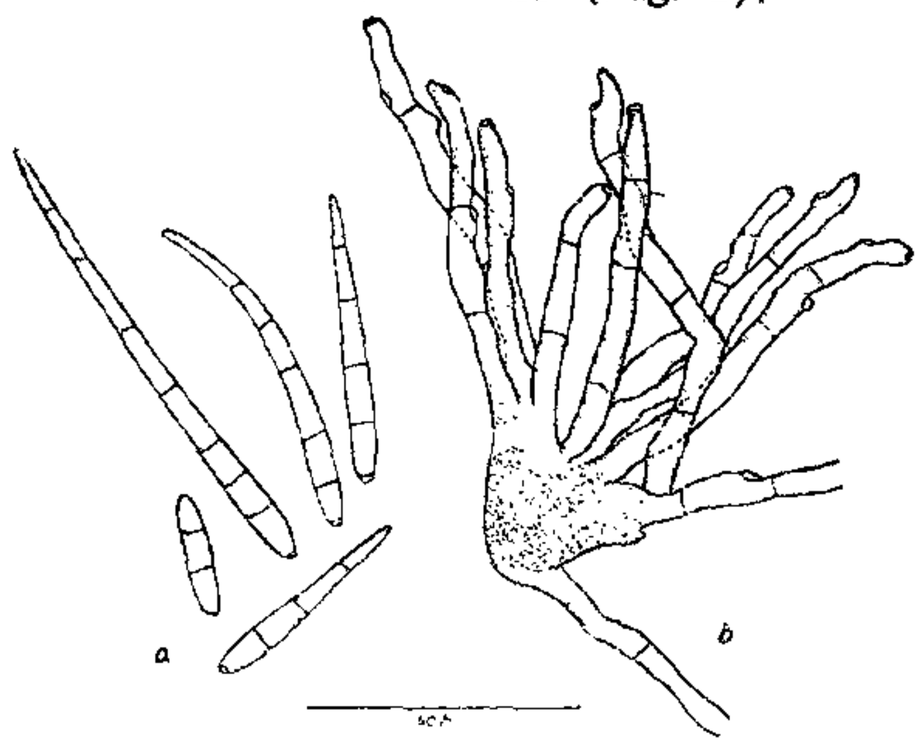


FIG. 1. *Cercospora pluchea tomentosæ.* (*a*) Conidia. (*b*) Stroma with conidiophores.

Petrak and Ciferri (1930)[1] reported *Cercospora pluchecæ* Petrak and Ciferri on *Pluchea odorata* (Compositæ) from San Domingo, Bermuda, Mona and Venezuela which differs from this fungus in having smaller conidiophores (40–110 × 3–5·5 μ) and larger conidia (30–120 × 4–5·5 μ). Mr. F. C. Deighton of the Commonwealth Mycological Institute, Kew, Surrey, England, is of the opinion that the fungus causing the leaf-spots of *Pluchea tomentosa* at Kanpur is a new species of *Cercospora* similar in general characters with *Cercospora apii*. Hence the name *Cercospora pluchea-tomentosæ* is proposed for which the Latin diagnosis is given blow :

Cercospora pluchea-tomentosæ Sp. Nov.

Maculæ amphigenæ, e circularibus irregulares, 1–5 mm. diam. ; pallide roseæ in facie superiore, marginibus 'mars' brunneis, olivaceobrunneæ in facie inferiore, sporulatione amphigena sef copiosiore in facie superiore ; stroma globosum vel aliquantum irregulare, fusce brunneum, 10·8 to 25·9 μ diam. ; conidiophora fasciculata 3–11 vel plura, 2–6 septata, 2–5 geniculata, apice