TABLE I

Measurements of somatic chromosomes of H. punctatus *Dalz.*

Chromosome pair	Length in μ Long arm + Short arm = Total	Relative length	Arm Ratio R1	Arm Ratio R2	Centromere
1, 2	2·46 + 1·36 = 3·82	100·00	0·55	1·80	nsm
3, 4	2·38 + 1·36 = 3·74	97·90	0·57	1·75	nsm
5, 6	2·29 + 1·36 = 3·65	95·54	0·59	1·68	nsm
7, 8	2·12 + 1·53 = 3·65	95·54	0·72	1·38	nm
9, 10	2·38 + 1·02 = 3·40	89·00	0·40	2·33	nsm
11, 12*	0·68 + 1·36 + 1·27 = 3·31	86·64	0·62	1·60	nm
13, 14	2·21 + 1·10 = 3·31	86·64	0·50	2·00	nsm
15, 16	2·12 + 1·10 = 3·22	84·29	0·51	1·92	nsm
17, 18	1·53 + 1·36 = 2·89	75·65	0·88	1·13	nm
19, 20	1·70 + 0·93 = 2·63	68·84	0·54	1·93	nsm
21, 22	1·53 + 1·10 = 2·63	68·84	0·72	1·39	nm
23, 24	1·36 + 1·19 = 2·55	66·75	0·87	1·14	nm
25, 26	1·23 + 1·02 = 2·25	58·90	0·82	1·20	nm
27, 28	1·36 + 0·85 = 2·21	57·85	0·62	1·60	nm
29, 30	1·02 + 0·76 = 1·78	46·59	0·74	1·34	nm
31, 32	0·85 + 0·59 = 1·44	37·69	0·69	1·60	nm

nsm = Nearly submedian; nm = Nearly median; * Par with secondary constrictions.

meres. One pair with nearly median chromosomes are with secondary constriction on short arms (Table I). The length of the chromosomes in the complement range from 1·44 μ to 3·82 μ with a mean length of 2·90 μ. The absolute length is 46·48 μ.

During meiosis 16 bivalents were observed at diakinesis and metaphase 1 (Figs. 2, 3). The subsequent divisions were found to be normal indicating the regularity of meiosis.

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REDUCTION IN TOTAL NITROGEN CONTENT OF 'ARHAR' SEEDS DUE TO STORAGE FUNGI

DURING the course of an investigation, several fungi were isolated from the 'Arhar' seeds. Amongst them *Aspergillus flavus*, *A. niger*, *Fusarium moniliforme*, *Curvularia lunata* and *Helminthosporium tetramera* were isolated[1] frequently. The storage fungi cause considerable loss in seed contents[2–5]. Nitrogen is an indispens_ble element for the synthesis of nucleic acid, protein, enzymes, etc.; hence it is desirable to estimate the changes in the total nitrogen contents of 'Arhar' seeds in the presence of these fungi. Healthy 'Arhar' seeds were surface sterilized with 2% NaClO and were treated with spore suspension of the fungi listed above. Healthy and infested seeds were stored separately in different sterilized desiccators at 75% relative humidity[6] and had a moisture content of about 16%. After three months of storage the seeds were thoroughly washed and dried. Duma's method was used to estimate the nitrogen content. Ten to twenty mg of the seeds were used for this purpose.

It is obvious from Table I that in the healthy 'Arhar' seeds the total nitrogen remained unchanged even after three months of incubation. Infested seeds on the other hand showed marked fall in the total nitrogen content. The deterioration in nitrogen contents by *A. niger* was the highest. The nitrogen is

utilized by the fungi and part of this is converted into gaseous nitorgen also.

TABLE 1

Changes in total nitrogen content of 'Arhar' seeds due to infestation with storage fungi

Fungi	Total nitrogen in mg/100 mg	Percentage of loss
Aspergillus flavus	2·05	43·33
A. niger	1·88	48·05
Fusarium moniliforme	2·65	25·66
Curvularia lunata	3·12	13·61
Helminthosporium tetramera	3·17	12·22
Control	3·61	No loss

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IN VITRO INDUCTION OF ADVENTITIOUS SHOOTS ON STEM EXPLANTS OF *BOERHAAVIA DIFFUSA* L.

PLANT tissue cultures are becoming increasingly important as an experimental system to study many fundamental problems in developmental morphogenesis and biosynthesis of natural products[1,2]. *Boerhaavia diffusa* Linn. is known to be a medicinal shrub and commonly used in jaundice, ascites, anasarca and scanty urine diseases[3]. This communication describes a method for obtaining callus and adventitious shoots from the stem explants of *B. diffusa*.

Stem explants (2–3 cm) were placed horizontally on Murashige and Skoog's[4] medium supplemented with auxins (NAA and 2, 4–D) and cytokinins (Kn or BAP). The cultures were maintained in light grown chamber at 28° ± 2° C in 16 height (1,000 lux). Various concentrations of NAA, Kn and BAP (alone and combinations) were tried to study the callus growth and morphogenetic responses of explants.

The callus induction was observed after 7 days of transplant, on MS medium containing NAA (1·0 ppm), 2, 4–D and Kn (each in 0·25 ppm). The maximum callus growth was maintained on MS with NAA (0·5 ppm), 2, 4–D (0·25 ppm) and Kn (0·25 ppm). Callus obtained was soft, fragile and watery. Higher NAA (1·0–10·0 ppm) concentrations were found inhibitory to callus growth. The callus turned compact, hard and light brown with the increase in Kn (1·0–2·5 ppm) concentrations. Organogenesis occurred on auxin devoid medium, containing BAP (0·25 ppm) after 3–4 weeks (Fig. 1). No root was observed in

FIG. 1. Shoots of *B. diffusa* produced from stem explant on MS + BAP + Kn (each in 0·25 ppm) media, devoid of auxin.

shoot forming explants. A large number of adventitious shoots were formed on various concentrations of BAP in combination with Kn (0·25 ppm) and NAA (0·05 ppm) (Fig. 2). The maximum (20·25), well developed shoots were produced with BAP (1·0 ppm) after 6–8 weeks. Leaves produced on these shoots were small, curved and light green in colour. The stem was thick, soft, and yellowish green. These differentiating explants initiated only a small amount of callus which stopped further growing after 2 weeks.