C. grandiflora × *E.* sp. (hybrid; Fig. 3 A–C): grains 3-zonocolporate (80%) or 4-zonocolporate (20%); endocolpium lo-longate, 12·5 × 9 μm Exine 1·7 μm thick, surface very distinctly reticulate-regulate; brochi of apocolpium clearly larger than those of mesocolpium. *Size measurements* : Fertile grains (94%)—av. 38·2 × 35·0 μm (Range 31·5–44·1 μm × 29·4–39·9 μm). Sizes of sterile grains (6%) not taken.

It may be pointed out that the pollen grains of *C. grandiflora* (female parent) are characterized by the lo-longate endocolpium and thin exine with a psilate surface as against the lo-longate endocolpium, and thick exine with faint and uniform reticulate-rugulate ornamentation in *E.* sp. (male parent). In the pollen grains of the hybrid, the endocolpium is lo-longate and the exine is thick with very distinct reticulate-rugulate ornamentation, and further the brochi of the apocolpium are larger than those of the mesocolpium, which serves to delimit the apocolpium from the mesocolpium.

In addition, the frequency of 4-zonocolporate grains is slightly more in the hybrid than in the two parents. The above marker characters indicate that the pollen grains in the hybrid possess a dominance of male characters such as lo-longate endocolpium, thick exine, and basic reticulate-rugulate exine ornamentation and a larger percentage of 4-zonocolporate grains. However, the hybrid grains also possess new characters such as clearer reticulate-rugulate pattern and the differentiation of the apocolpium with larger brochi, from those of the mesocolpium with smaller brochi.

Similar studies made during recent years have indicated the dominance of male[2], female[3], or intermediate situation between the two parents[4–7], as the one presently found. The uniform occurrence of a new mormorphotype in the hybrid provides proof to presume that the exine pattern is controlled sporophytically by the diploid genome of the pollen mother cell as held by Heslop–Harrison[8].

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1. Erdtman, G., *Pollen Morphology and Plant Taxonomy*, I. *Angiosperms*, *Stockholm*, 1952.
2. Srivastava, Veena, *Grana*, 1978, **18** (In press).
3. Nair, P. K. K., Kamalesh Katiar and Srivastava, G. S., *Curr. Sci.*, 1977, **46**, 824.
4. Hendersen, D. M., *Grana*, 1972, **12**, 52.
5. Grant, C. A., *Ibid.*, 1972, **12**, 177.
6. Rajendra, B. R., Tomb, A. S., Mujeeb, K. A. and Bates, L. S., *Pollen et spores*, 1978, **20**, 145.
7. Ravi Kumar, C., Nagaraj, M. and Nair, P. K. K., *Abstracts of II Indian Palynological Conference, Bangalore*, October 1978. Abstract No. 22.
8. Heslop–Harrison, J., *Science*, 1968, **161**, 230.

SOME PROMISING EARLY DWARF MUTANTS IN BARLEY VAR. CLIPPER

INDUCTION of early and short statured mutants with good grain quality and resistant to lodging during inclement weather, associated with other desirable attributes seems to be an immediate need for genetic improvement of traditionally tall growing barley varieties[1,2]. The present investigation deals with the isolation of the mutant for the yield and its components as well as protein content in the barley (*Hordeum distichum* L.) var. Clipper.

Certified seeds of barley var. Clipper were obtained from Division of Plant Introduction, I.A.R.I., New Delhi. The dry seeds were irradiated with 5, 10, 15, 20, 30, 40 and 50 kR doses of ^{60}Co gamma-rays. Irradiated seeds were stored for 72 h and sown in the field.

Plants were chosen on the basis of high sterility or high chromosomal aberrations in pollen mother cells and also phenotypically abnormal, where M_1 families to be grown in M_2 generation. In all 472 M_1 families were raised as a single plant progeny in M_2 generation. The M_2 population was screened for early and short statured mutants.

Eleven mutants along with control were raised in a randomized block-design, using four replications in the M_3 generation. Observations of the yield components were recorded on 10 mutants in each replication. Total protein was analysed by using the standard microkjeldahl procedure.

Table I reveals that the mean values of the yield and its components of the mutants (BB–EDf), along with other mutants and control in the M_3 generation, are highly significant for short statured, number of effective tillers per plant, grain yield per plant and early maturity traits than the control. The high yielding ability of the mutants is probably due to more tillering capacity with high fertility and improved plant type, reflected by its erect growth habit associated with short and stiff straw and broad dark green leaves. A plant type endowed with such characters has been considered as an important criterion with regards to the satisfactory response to fertilizer use and higher sowing density[3]. Further, plants with small, thick and

TABLE I

Mean yield components of the mutants and control in M_3 generation

Control and mutants	Height (cm)	Aera cf flag leaf (cm^2)	Tillers/ plant (no)	Spike length (cm)	Spikelets/ spike (no)	Grains/ spike (no)	100-grain weight (g)	Grain yield/ plant (g)	Total protein (%)	Maturity (days)
Control	81·8	6·5	20·5	8·2	27·0	26·2	5·2	27·6	11·3	163
BB–ESDf 1	67·5**	11·0**	41·4**	7·9	30·0*	27·5	5·2	51·3**	12·1	156**
BB–ESDf 4	60·1**	5·3	43·3**	7·8	26·7	21·6*	5·5	53·4**	11·4	155**
BB–ESDf 5	60·4**	5·7	29·4**	9·0**	27·0	25·1	5·3	41·4**	10·4	157**
BB–EDf 7	41·4**	14·1**	80·2**	11·4**	39·4**	37·5**	6·4*	72·7**	13·0*	141**
BB–EDf 8	44·8**	12·7**	76·7**	12·0**	31·0**	28·4	6·1**	70·8**	11·7	142**
BB–EDf 11	43·4**	3·9**	54·4**	7·8	41·3**	38·4**	5·2	62·6**	12·0	139**
BB–EDf 12	51·0**	3·1**	40·0**	9·7**	32·0**	29·9	4·1	57·7**	11·4	143**
BB–EDf 14	48·3**	4·5	44·5**	11·3**	34·1**	30·5*	5·9	55·1**	12·3	154**
BB–EDf–Hp 1	42·4**	13·2**	45·0**	10·3**	39·0**	37·0**	5·8	59·3**	15·5**	144**
BB–EDf–Hp 2	39·9**	7·4	51·0**	11·4**	37·5**	36·0**	6·2*	50·0**	14·9**	150**
BB–ESid 9	70·9**	6·7	36·0**	5·0**	27·2	26·3	5·3	49·9**	10·9	146**

Significant at 5% (*) and 1% (**) levels, respectively.
BB–ESDf : Bichpuri Barley — Early Semidwarf.
BB—EDf : Bichpuri Barley — Early Dwarf.
BB–EDf–Hp : Bichpuri Barley — Early Dwarf High protein.
BB–ESid : Bichpuri Barley — Early Stunted.

dark green leaves, arranged vertically can make efficient use of solar radiation[4]. Various reports indicate that the yield is higher in short statured mutants of cereals as compared to tall parental varieties[5,6]. Hence, simultaneous induction of the two desirable characters such as earliness and short stature in these mutants is of real value. These early dwarf mutants may prove to be a suitable breeding material for incorporating earliness and dwarfness in the existing late and tall promising varieties of barley.

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1. Bansal, H. C., *Indian J. Genet*, 1972, **32**, 203.
2. Singh, J. and Singh, R. M., *B.G.N.*, 1975, **5**, 55.
3. Borojevic, K. and Borojevic, S., *Induced Mutations and Plant Improvement, IAEA, Vienna*, 1972, 237.
4. Tsunda, S., *Jpn. Breed.*, 1959, **9**, 237.
5. Reddy, G. M. and Reddy, T. P., *Proc. Int. Sym. On use of Isotopes and Radiations in Agriculture and Animal Husbandry Research*, New Delhi, 1971, p. 237.
6. Kumar, D., *Environmental and Experimental Botany*, 1977, **17**, 79.

A NEW SPECIES OF *STENELLOPSIS*

IN the course of mycological collections the author collected a leaf spot on *Shorea robusta* Gaertn. f. (Sal tree) which on examination was found to be caused by a species of *Stenellopsis* belonging to dematiaceous hyphomycetes.

The present species of *Stenellopsis* was compared with the type species *S. fagraeae* Huguenin[1] and was found to differ greatly in its conidial and conidiophore morphology and as such described here as a new species.

Stenellopsis shorae Singh sp. nov.: On the living leaves of *Shorea robusta* Gaertn. f., Soopkhar, Balaghat, Dec. 1978, leg. S. M. Singh.

Colonies effuse, black, hypophyllous; mycelium immersed, stroma immersed, prosenchymatous; conidiophores in tufts, macro-nematous, mononematous, sympodial, unbranched, dark brown, sometimes geniculate, straight to flexuous, smooth 27–50 × 5·5–6 μm (40 × 5·5 μm); conidiogenous cells integrated, terminal, polyblastic, cicatrized; conidia dry, solitary, terminal, acropleurogenous, dark brown, multicelled (3–10 septate), cylindrical to obclavato-cylindrical, base truncate with scar of attachment, apex tapering, lighter in colour often with dry abnormal cells, smooth, thick walled, flexuous, rarely straight, 25–60 × 6·2–6·7 μm (35 × 6·5 μm) (Fig. 1).

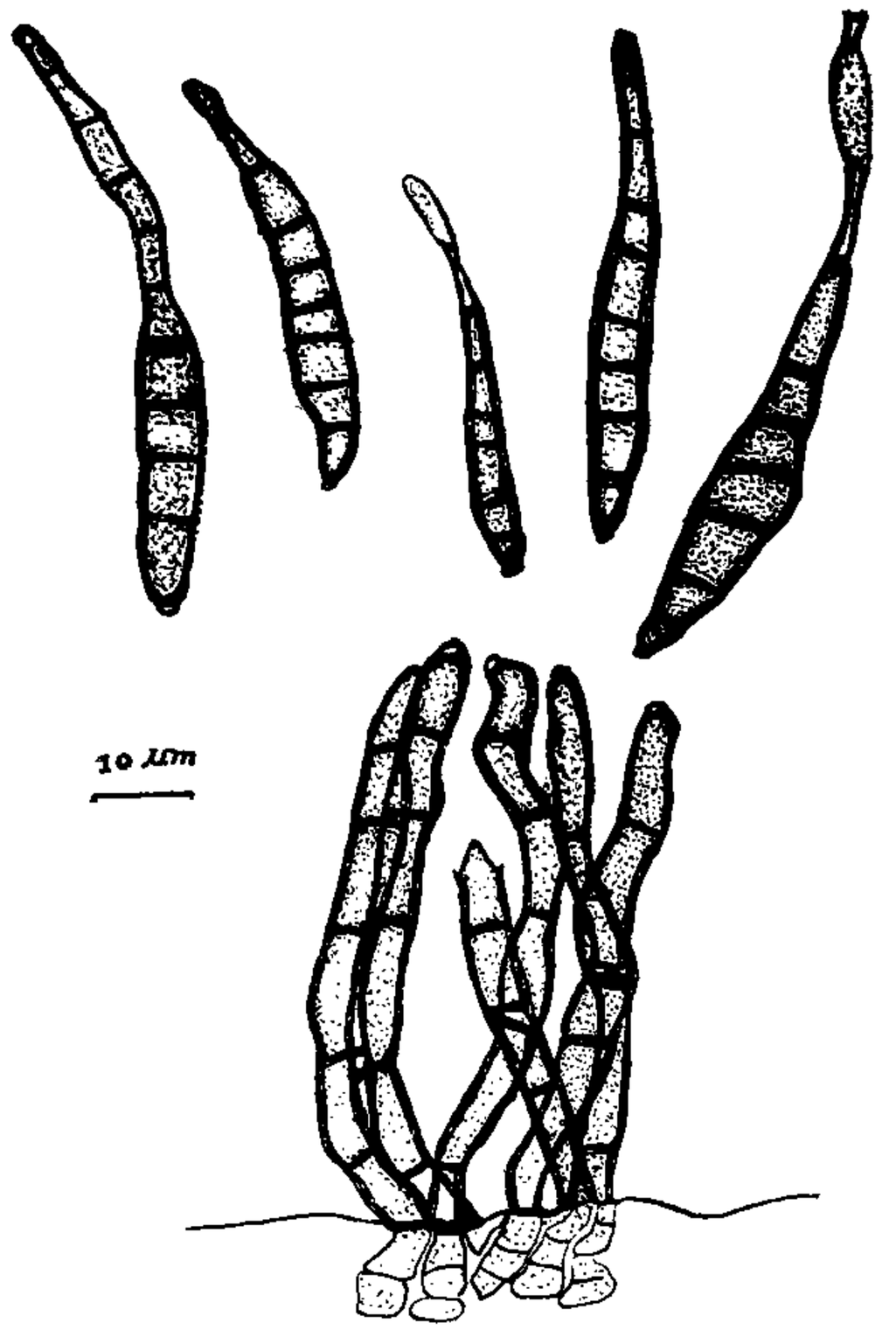

FIG. 1. *Stenellopsis shorae* Singh sp. nov. showing conidia and conidiophores.

Stenellopsis shorae Singh sp. nov.

Coloniae effusae, nigrosae, hypophyllosae; mycelium immersum; prosenchymatosum; conidiophori macronematosi, mono-nematosi, non-ramosi, sympodiales fusce brunnei, flexuosi raro recti, leves 27–50 × 5·5–6 μm (40 × 5·5 μm); cellulae conidiogenosae, polyblastosae, integratae, terminales, cicatricosae; conidia singularia, arida, acropleurogenosa, simplica, obclavato-cylindrica, in basi angusta cum cicatrice junctionis, in apice minuentia, colore pallidiora, saepe cum cellulis aridis abnormibus et cum parietibus crassis, fuscae brinnea, levia, cum pariete crasso, multiseptata (3–10 septata) flexuosa raro recta 25–60 × 6·2–6·7 μm (35 × 6·5 μm).

Typus positus in herbario I.M.I. Kew No. 233004.

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