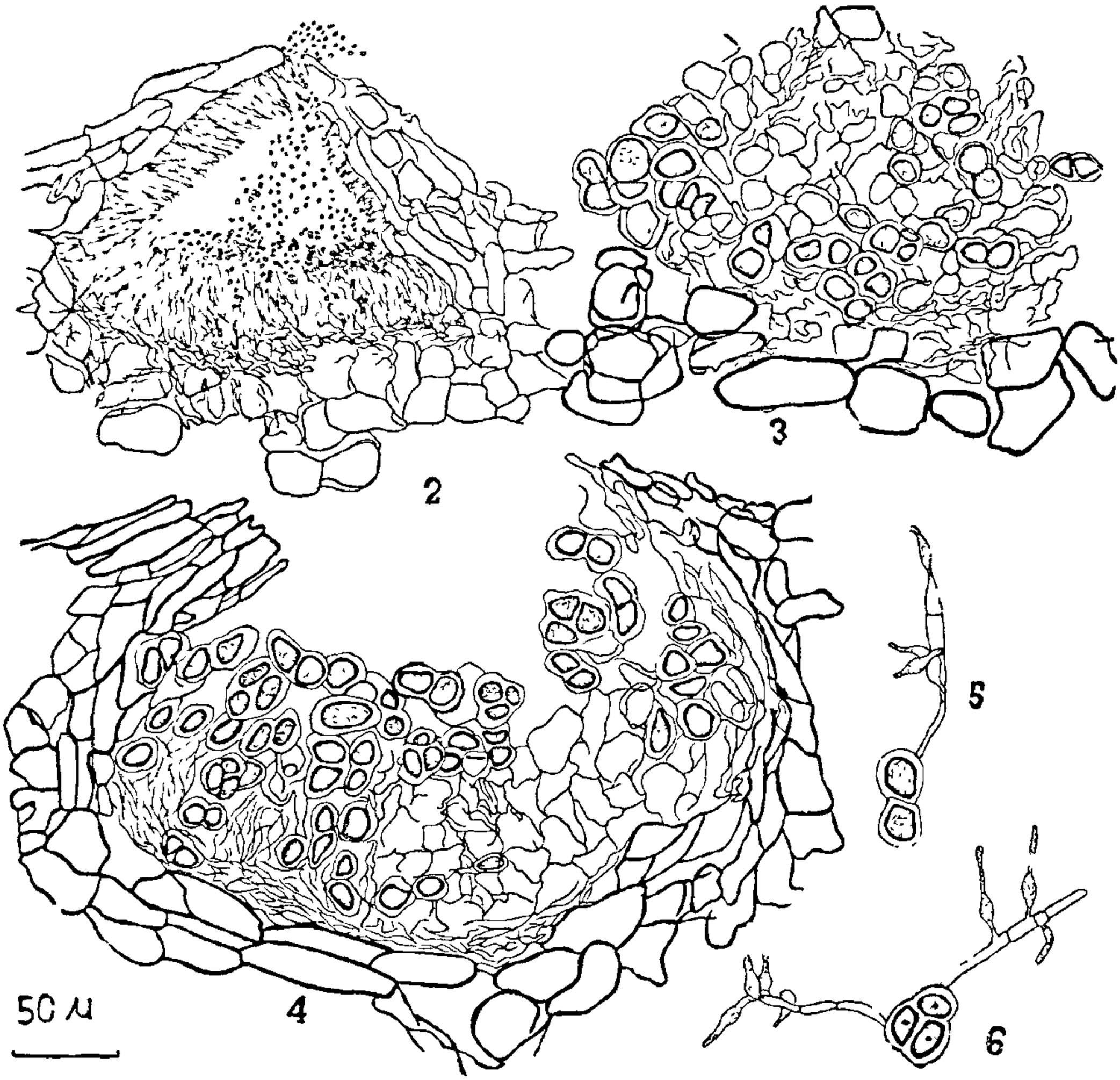

FIGS. 2–6. Fig. 2. Pycnil stage. Fig. 3. Uredospores mixed with teleutospores. Fig. 4. Telial stage, Figs. 5. and 6. Germinating teleutospores.

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AMELIORATION OF DROUGHT INJURY IN RICE BY CHEMICAL SPRAYS

EFFORTS made so far to evolve high yielding rice cultures for drought areas are meagre[1]. Several chemicals have been suggested to be useful in reducing the drought injury in different crop plants[2]. In the present investigation, the effect of foliar spray of seven growth regulating chemicals in ameliorating drought injury has been examined under pot culture experiments.

Two early cultivars, *CR.* 143-2-2 (*CR.*143) and *Cauvery* (100–105 days total duration) were grown in pots containing 7 kg dry soil with normal irrigation up to 30 days after sowing (DAS) and later subjected to two cycles of drought (FC to WP) during the period 30 to 45 DAS. At the end of each drought cycle

TABLE I

Effect of foliar spray of chemicals on the yield of rice varieties under drought stress at vegetative stage

Treatment	Grain yield g/pot		Grains/pan		Shoot wt. g/pot		Harvest Index	
	CR 143	Cauvery	*CR* 143	Cauvery	*CR* 143	Cauvery	*CR* 143	Cauvery
Drought (Control)	12·6	12·9	42	25	17·3	29·4	41·6	30·2
Drought + kinetin (10 ppm)	21·4	20·8	67	34	21·7	32·6	49·5	38·6
Drought + ascorbic acid (100 ppm)	19·5	20·1	62	38	21·1	32·1	48·1	38·9
Drought + GA (10 ppm)	18·9	16·9	57	26	19·7	31·6	48·4	34·7
Drought + CCC (1,500 ppm)	18·7	15·8	58	35	16·7	31·2	52·5	33·6
Drought + Planofix (10 ppm)	21·9	10·9	65	27	21·4	26·7	50·7	27·9
Drought + Proline (10 ppm)	12·2	10·2	55	26	22·3	32·3	34·7	22·9
Drought + abscisic acid (ABA) (10 ppm)	12·6	12·1	31	23	28·6	30·5	30·5	28·0
Normal watering	19·6	15·7	55	34	17·4	27·2	53·1	36·8
Mean	17·5	15·0	55	30	20·7	30·5	45·5	32·4
CD (5%)	7·3	6·5	15	8	6·5	ns	8·5	ns

both varieties showed moderate wilting (score 5). The plants were irrigated normally after the drought treatment. Twenty-four hours after reirrigation, *i.e.*, when the plants showed full recovery, they were sprayed with chemicals as stated in Table I at the rate of 60 ml aqueous solution per pot. A second spray was given a week later. A control without chemicals spray after drought treatment and a check with normal irrigation were also maintained for comparison.

Under the induced drought treatment at 30–45 DAS, the ultimate grain yield was reduced by 18% and 36% in *Cauvery* and *CR* 143 respectively due to high spikelet sterility, low grain number/panicle and low harvest index when compared with normal irrigated plants. Foliar spray of kinetin (10 ppm) reduced the drought injury as evident by increased grain number/panicle, high shoot weight and harvest index which collectively enhanced the grain yield by 9% and 32% even over the normal irrigated pots in the above two varieties respectively. Ascorbic acid (100 ppm) also showed promotive influence on yield especially in *Cauvery* (25% more than normal). Planofix (100 ppm) did not indicate consistent response and it showed beneficial effect in yield of *CR* 143 only. ABA and proline were ineffective while GA and CCC were intermediate in their response.

Earlier workers have recommended spraying of antitranspirants like CCC[8], abscisic acid[3] and morphactins[4] and growth stimulants like kinetin or GA[5] or ascorbic acid[6,7] to relieve the drought stress in different crops. However, in the present study, kinetin spray (10 ppm) proved to be more efficient in ameliorating drought injury and in increasing the yield of the drought affected rice crop.

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