Table 1 *Micronutrients (μg/g leaf) of leaf leachates of control and zineb sprayed leaves of zea mays*

Days after spray	Control			Zineb		
	Iron	Na	K	Iron	Na	K
1	0.8	8.0	30	3.5	8.0	50
3	0.7	7.0	35	2.5	3.0	28
5	0.9	10.0	15	2.0	18.0	15
10	2.0	12.0	20	2.6	7.0	18
15	3.2	15.0	28	2.5	8.0	10
25	3.5	8.0	30	2.6	10.0	28
40	4.0	10.0	15	2.0	15.0	38
Mean	1.85	10.0	24.7	2.6	9.9	26.7
± SD	1.15	2.56	7.40	0.45	4.70	12.90

change in the sodium content. In general, young leaves of control leached less nutrients than older leaves, while such variation cannot be noticed in sprayed leaves. There is significant deviation in the iron content in control as there is a lot of variation in the young and old leaves. Variation is not significant in sprayed samples while there is considerable variation in the sodium and potassium content in treated leaves.

Variable amounts of ninhydrin-staining compounds with fungicides and small amount of total amino acids due to pesticide spray have been reported earlier[1,4]. Certain antibiotics are also known to induce leakage of potassium, NH_4^+ and carboxylic acids[8]. The above results show that fungicidal spray results in the variability of different micronutrients through leaching.

21 November 1986; Revised 25 February 1987

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REMOVAL OF SEED DORMANCY BY GA IN SOME WEEDS

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DORMANCY is caused by seed characteristics or by a set of environmental conditions. It generally helps in overcoming unfavourable season, by stopping embryo growth during seed maturation. Dormancy in weed seeds is often highly developed; certain plant species also become weeds due to the system of dormancy they have evolved[1]. A large number of growth regulators have been reported for breaking dormancy and enhancing seed permeability, thus inducing and hastening their germination[2]. Gibberellin-like substance has been seen in a number of seeds which plays an important role in *de novo* synthesis of α-amylase which hydrolyses starch reserves in the endosperm. In the present study, an attempt has been made to observe the effect of gibberellic acid on seed germination of two kharif season weeds: *Borreria articularis* (Linn.) F. N. Will and *Trianthema portulacastrum* Linn. and a rabi season weed of irrigated fields, *Plantago ovata* (Forsk.) in Indian desert.

Seeds of *B. articularis* and *T. portulacastrum* were collected from the New Campus of the University, and that of *P. ovata* from a farmer's field near CAZRI, Jodhpur. Germination studies were carried out in sterilized petri dishes lined with a single layer of filter paper and moistened with distilled water. The experiments were performed in triplicate with each petri dish containing 10 seeds. All experiments were performed in continuous light (1000 Lx) at 28 ± 2°C. The seeds of all the three species were given the soaking pre-treatment in 10, 50, 100 and 200 ppm of GA for 24 hr and 48 hr. Observations were taken at the end of seven days.

A brown diffusate is released on the filter paper when moist seeds are kept for germination. Since fresh seeds poorly germinate it was presumed that either some inhibiting factors are responsible for the lack of germination or the embryo lacks the vigour to develop.

It is evident from table 1 that seeds of *B. articularis* and *T. portulacastrum* exhibited only 26.6% germination, while those of *P. ovata* with hard seed coat exhibited dormancy as no germination was obtained in continuous light. GA at all concentrations enhanced the germination percentage in *B. articularis* and *P. ovata*, while in *T. portulacastrum* only 10 ppm brought about 46.6%

Table 1 *Effect of different concentrations (ppm) of gibberellic acid on seed germination (%) of B. articularis, P. ovata and T. portulacastrum (observations taken at the end of 7 days)*

	B. articularis	*P. ovata*	*T. portulacastrum*
Control	26.6 ± 20.8	0 ± 0	26.6 ± 2.08
Duration of soaking (24 hr)			
10	56.6 ± 5.7	53.3 ± 5.7	46.6 ± 11.7
50	70.0 ± 10.0	80.0 ± 10.0	23.3 ± 5.7
100	46.6 ± 15.2	36.6 ± 11.5	23.3 ± 5.7
200	43.3 ± 5.7	33.3 ± 5.7	16.6 ± 20.8
Duration of soaking (48 hr)			
10	73.3 ± 5.7	23.3 ± 25.1	20.0 ± 17.3
50	100.0 ± 0.0	66.6 ± 5.7	23.3 ± 23.0
100	93.3 ± 5.7	60.0 ± 0.0	33.3 ± 15.2
200	90.0 ± 17.3	26.6 ± 11.5	13.3 ± 15.2

germination. Higher concentration of GA proved detrimental for this species, as the germination percentage did not increase with increase in GA concentration. In *B. articularis*, maximum germination percentage was observed in 50 ppm solution when seeds were soaked for 48 hr. However, seeds of *P. ovata* exhibited maximum percentage of germination after 24 hr soaking in 50 ppm GA. At higher concentrations the decrease in germination percentage was significant in case of *P. ovata*, but this was marginal in *B. articularis*.

Five ppm of GA increased the germination percentage of *Celosia argentea*[3]. Increased germination percentage in seeds of *Farsetia hamiltonii* with increase in GA concentration was also noted[4]. Ten per cent germination in 5 and 10 ppm solutions of GA and 40 and 80% germination in fresh and one year stored seeds, respectively was obtained. Germination of seeds can be promoted in *Chenopodium album* by providing 100 ppm of GA, beyond which decline in germination percentage occurred[5]. Dormancy in seeds of *B. articularis* due to endogenous inhibitor and its removal by gibberellic acid[6], is also supported by the present study. Thus it was recorded that germination percentage of *B. articularis* and *P. ovata* seeds can be improved by providing 50 ppm of GA, and of *T. portulacastrum* by 10 ppm GA.

Thanks are due to ICAR, New Delhi for financial assistance.

25 November 1986; Revised 12 February 1987

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CAN THE USE OF *AZOSPIRILLUM* BIOFERTILIZER CONTROL SORGHUM SHOOTFLY?

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THE sorghum shootfly, *Atherigona soccata* Rond is a major pest of sorghum in most areas of Asia, Mediterranean Europe, Africa and India[1]. The flies deposit eggs on the leaves of young plants and the larvae cut the growing point causing 'dead heart'[1]. An effective chemical control measure advocated to farmers is the application of carbofuran 3 G, a systemic insecticide, as seed and seed furrow treatment[1]. However, the use of sorghum cultivars resistant to fly attack appears to be the most promising approach to fly management[2]. Attempts have been made to determine the biochemical basis of resistance with special reference to plant phenolic compounds.

Phenolic compounds have gained considerable interest in the control of insect pests and diseases of crop plants[3]. When phenolics occur in fairly large concentrations, because of their direct toxicity, insect pests are warded off[4]. In plant tissues, these compounds are noted for their age-related changes in concentration especially in *Sorghum bicolor* and their distastefulness to sorghum insects[5]. Any attempt to enhance the level of these distasteful factors in sorghum may eventually help reducing the shootfly incidence. The recently introduced biofertilizer *Azospirillum* (peat soil based preparation containing N_2 fixing live cells of *Azospirillum*) is being enthusiastically used by farmers for sorghum, ragi and cotton crops. It has been a common