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STOMATAL MOVEMENT AND BEHAVIOUR AS INFLUENCED BY BASALIN AND SATURN IN SOME WEED SPECIES

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THE direct influence of several biochemical inhibitors on the mechanism of stomatal movements has been well studied[1]. However relatively few studies have been made on the effect of herbicides on the stomatal movements and behaviour. The herbicides, Basalin and Saturn are extensively used in crop fields to control various types of weeds. The effect of Basalin (N-propyl-N-(2' chloro ethyl)-2, 6-dinitro-4 trifluromethyl aniline) and Saturn (S-(-4 chlorobenzyl) N-N-diethyl thiocarbamate) on stomatal movement and behaviour was studied with respect to pore length and stomatal conductance. The high degree of correlation, of the resistance or susceptibility of a particular plant, to a given herbicide with the appropriate changes in the stomatal aperture was observed.

Healthy seedlings of plants were transplanted to experimental plots from their natural habitat and grown under natural photoperiod (28° day/20° night). Four weeks after transplantation, 1000 ppm concentration of Basalin and Saturn were applied as a foliar spray up to the drip point at 8 hr, with manually operated "Aspee" sprayer. Control plants were maintained by the simultaneous spray of deionised water. The stomatal aperture and stomatal conductance were measured at regular intervals of 24, 48 and 72 hr after herbicidal treatment. The width of stomatal aperture was measured using a pre-calibrated ocular micrometer[2]. The stomatal conductance of leaves was also determined[3].

Data presented in table 1 reveal that immediately after herbicidal spray the width of stomatal pore decreased rapidly, and only a few plants recover by opening their stomata after 72 hr. The decrease in the stomatal conductance (table 2) is correlated with the stomatal closure induced by the two herbicides. The role of potassium and ATP in stomatal closure and opening was variously interpreted by several authors[4-7].

Results indicate that stomatal closure occurred in all plants (table 1) and the stomatal closure is permanent in susceptible plants. The authors have also observed that the plants, in which the stomatal closure is permanent result in the desiccation and death of the plants. But in a few plants, the slight stomatal reopening was observed after 72 hr for a few days, showing resistance to the chemical spray at that concentration. It can therefore be concluded that the stomata are effective determinants for the resistant (or) susceptible nature of the plants for a given herbicide.

Table 1 *Effect of Basalin and Saturn on Stomatal opening (in μm)*

Plant Species	Control	Basalin 1000 ppm (hr)			Saturn 1000 ppm (hr)		
		24	48	72	24	48	72
Commelina benghalensis L.	12.3 ±0.2	4.2 ±0.1	3.8 ±0.1	3.5 ±0.1	4.5 ±0.1	2.6 ±0.1	2.0 ±0.1
Digera arvensis Forsk.	4.8 ±0.2	2.2 ±0.1	2.2 ±0.1	3.2 ±0.1	2.5 ±0.1	2.9 ±0.1	3.5 ±0.2
Euphorbia hypericifolia L.	4.2 ±0.1	2.5 ±0.1	2.1 ±0.1	2.1 ±0.1	2.5 ±0.1	2.2 ±0.1	2.1 0.1

(Values are the mean of 5 observations ± S. E)

Table 2 *Effect of Basalin and Saturn on Stomatal conductance (cm sec^{-1})*

Plant Species	Leaf surface	Control	Basalin 1000 ppm (hr)			Saturn 1000 ppm (hr)		
			24	48	72	24	48	72
Commelina benghalensis L.	Adaxial	0.20 ±0.006	0.16 ±0.002	0.13 ±0.001	0.14 ±0.002	0.15 ±0.002	0.13 ±0.004	0.13 ±0.001
	Abaxial	0.31 ±0.002	0.26 ±0.002	0.27 ±0.005	0.29 ±0.004	0.29 ±0.003	0.21 ±0.002	0.17 ±0.001
Digera arvensis Forsk.	Adaxial	0.24 ±0.005	0.20 ±0.006	0.17 ±0.002	0.20 ±0.008	0.17 ±0.004	0.19 ±0.002	0.22 ±0.001
	Abaxial	0.25 ±0.007	0.19 ±0.002	0.16 ±0.001	0.24 ±0.002	0.19 ±0.003	0.15 ±0.002	0.14 ±0.002
Euphorbia hypericifolia L.	Adaxial	0.22 ±0.003	0.17 ±0.002	0.10 ±0.006	0.10 ±0.001	0.11 ±0.001	0.10 ±0.007	0.11 ±0.001
	Abaxial	0.25 ±0.006	0.21 ±0.006	0.18 ±0.001	0.16 ±0.006	0.18 ±0.004	0.17 ±0.006	0.14 ±0.004

(Values are the mean of 5 observations ± S. E.)

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STUDIES ON SALT RESISTANCE IN WHEAT I. GROWTH AND DEVELOPMENT

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AMONG the wheat (*Triticum aestivum* L.) genotypes presently cultivated in India, variety Kharchia-65 is considered as the most salt resistant[1] and C-306 relatively susceptible[2] to salt stress. To understand the basis of salt tolerance in plants, a comprehensive programme was undertaken in which these two genotypes were studied in detail. In this communication, we report the relative salt resistance in the two genotypes at various stages of growth and development and the factors which contribute towards better salt resistance of Kharchia-65 over C-306 in terms of grain production.

The experiments were conducted in a screen house using sand culture. Polyethylene bags containing about 9 kg of thoroughly washed river sand were provided with a hole in one of the two corners of the bag. The hole was covered on the inside with a wad of glasswool to provide free drainage of water and also to check the sand loss. The bags were wrapped with a black polyethylene sheet to protect roots from exposure to light and to prevent algal growth. Before sowing, the bags were flooded with Hoagland's nutrient solution, with or without the salt mixture required to be added for salinization. A mixture of