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Short Communication

SCREENING OF CLUSTERBEAN (*CYAMOPSIS TETRAGONOLOBA* (L). (TAUB) GERMPLASM FOR TRANSPIRATIONAL COOLING

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Clusterbean, popularly known as *guar* (*Cyamopsis tetragonoloba* (L.) Taub) is one of the major rainfed *kharif* crops of the arid and semi-arid plains of North-West India. Its production is largely dependent on the rainfall, which is not only scanty but very erratic in this region during the crop season. This is the major challenging problem in increasing the production of this important industrial crop. To overcome this problem, some ways and means have to be developed by which uncertainty or reduction in productivity can be minimized during the drought years.

Breeding for drought tolerance is a tedious process. Only a few germplasm lines can be agro-physiologically evaluated for drought tolerance at a time due to lack of simple and quick screening techniques (Parsons, 1979; Jhonson, 1980, Sagar and Kapoor, 1986). Little is known about the genetics and stability of grain yield and other quantitative characters under water stress in guar. Until the information on nature and genetics of drought characterisation in gaur are known more precisely, plant improvement programmes would have to rely on screening techniques that are based on plant responses to drought stress (Fisher and Maurer, 1978 Stafford, 1983, Stafford and Mc Michal, 1991). Transpirational cooling (ambient air temperatures minus conopy temperature) has been reported to be a useful indirect indicator of plant water stress and has been indirect indicator of plant water stress and has been found to be highly correlated with seed yield in chickpea and mustard (Singh *et. al.* 1990). By rapid measurement of air and canopy temperature by infrared thermometry, it is possible to screen large number of crop cultivars. Lines thus selected can be subjected to detailed agro-physiological evaluation for drought tolerance.

Therefore, during *kharif*, 1990, mid-day (11.00-13.00h.) canopy and air temperatures were recorded by infrated thermometer, at pod initiation stage on two hundred twenty eight seed types and one

hundred twenty vegetable types of clusterbean at NBPGR Research Farm, Issapur (New Delhi), with a view to have an idea of transpirational cooling in this crop. This, in turn, could serve as a basis for field testing of selected germplasm lines for drought tolerance. The mean soil (5cm below surface) and air temperatures at the time of recording observations were 34.2°C and 40.6°C respectively.

The plant canopy of seed types of guar was found to be cooler than the ambient air in the range of 0.5°C (CH-99-1) to 8.3°C (DCB-190), while two guar genetypes (DCB-190 and CB- 200-2) exhibited more than 8°C transpirational cooling during mid-day, ten others viz, CH-200-1, CH-214-2, CHA 23-1, CHA 83-4, CHA 97-1, DCB-223, DCB-258, DCB-116, DCB-148 and DCB-90 maintained their canopies cooler than the ambient air in between 7°C and 8°C.

The vegetable types of clusterbean showed transpirational cooling in the range of 0.2°C (Ic-41156) to 7.2°C (IC-113880). Canopy temperatures of four guar genotypes viz; IC-40620, IC- 40633, CP-167 and CP-277, were observed to be less than the prevailing air temperature by 6°C to 7°C.

Thus, out of the 228 seed types and 120 vegetable types of clusterbean screened for Transpirational cooling, twelve seed types and five vegetable type exhibited relatively higher amount of transpirational cooling and merit detailed evaluation under drought conditions.

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