

Effect of sulphur, potassium and micronutrient complex on yield and free proline accumulation in mustard [*Brassica juncea* (L.) Czernj and Cosson] cv. 'VARUNA' under water stress condition

P.G. GAVADE AND K.Y. SHIGVAN

Accepted : February, 2008

SUMMARY

A field experiment was conducted during *rabi* season of year 1997-98 on laterite soil at Dapoli to study the effect of sulphur, potassium and micronutrient complex on yield and free proline accumulation in mustard [*Brassica juncea* (L.) Czernj and Cosson] cv. VARUNA. The application of sulphur @ 40 kg/ha, Potassium @ 60 kg/ha and micronutrient complex in the trade form of 'Bio green plus' increased yield per hectare. Among various treatments, sulphur is most promising which increased seed yield from 2.21 to 9.15 q/ha where as potassium and micronutrient complex elevated to 5.69 and 5.00 q/ha, respectively. The combination like sulphur + potassium + micronutrient complex significantly increased the yield of mustard compared with absolute stress control and even higher than irrigation control. The application of sulphur + potassium was another promising combination as it produced 10.37 q/ha seed yield. In current investigation, Potassium @ 60 kg/ha showed the maximum ability to generate the free proline content under water stress condition. Among the various treatment combinations sulphur + potassium + micronutrient complex generated maximum free proline content.

Key words : Mustard, Sulphur, Potassium, Micronutrient complex, Water stress.

Water is one of the major environmental factors affecting almost all aspect of plant growth and metabolism. It is well established that water stress reduces the growth and yield of crop plants. In Konkan region, oilseed cultivation is done during post monsoon season on very small area. The high infiltration rate and poor water holding capacity of soil (Dongale *et al.*, 1987) results in development of moisture stress and imposes limitation on cultivation of oilseeds crops on larger area. Further, practically there is no rainfall from October to May. Thus, crop requires frequent irrigation. Singh and Singh (1991) reported that moisture stress at siliqua initiation stage in mustard recorded highest reduction for seeds per siliqua (62.3%) followed by siliqua per plant (56.0%) and seed size (43.3%) when compared with irrigated control. The traditional rainfed cultivation of mustard warrants existence of native characteristics of stress tolerance in this crop. It is therefore, necessary to control the losses in seed yield due to water stress of this crop. Further, it is also required to formulate strategies and package for increasing the seed yield of this crop under water stress condition.

Various metabolites are accumulated in the plant tissue upon reduction in leaf water content, free proline amino acid accumulates at very high concentration with a subsequent rapid decrease in water content. Proline is a protective substance which minimizes the damage of dehydrated cells due to water stress. This experiment was conducted to find out effect of sulphur, potassium, micronutrient complex on yield and free accumulation of proline in mustard [*Brassica juncea* (L.) Czernj and Cosson] cv. VARUNA under water stress condition.

MATERIALS AND METHODS

A Field experiment was conducted during *rabi* season of year 1997-98 at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli on laterite soil in a randomized block design replicated 3 times. The field soil was found to be medium in available nitrogen (390.76 kg/ha), low in available phosphorus (13.60 kg/ha) and medium in available potassium (224.15kg/ha). The crop was subjected to various treatment *viz.* 40kg sulphur per hectare (S_{40}), 60 kg potassium per hectare (K_{60}), foliar spray of micronutrient complex in the trade form of 'Bio Green Plus' of Herba Agro Pvt.Ltd. Mumbai. The doses of sulphur and potassium were adjusted through single super phosphate and muriate of potash, respectively. The combination of treatments *viz.* sulphur @ 40kg/ha + potassium @ 60kg/ha, sulphur @40kg/ha. + micronutrient complex, potassium @ 60kg/ha + micronutirent complex and sulphur @ 40 kg/ha + potassium @ 0 kg/ha +

Correspondence to:

P.G. GAVADE, Department of Agricultural Botany, Govindraoji Nikam College of Agriculture, Mandki-Palvan. Tal. Chiplun, RATNAGIRI (M.S.) INDIA

Authors' affiliations:

K.Y. SHIGVAN, Department of Horticulture, Govindraoji Nikam College of Agriculture, Mandki-Palvan. Tal. Chiplun, RATNAGIRI (M.S.) INDIA