

Impact of salinity on the growth and productivity of selected mustard (*Brassica juncea* L.) varieties

R. DHANDAPANI AND S.K.S. PARIHAR

Accepted : March, 2009

SUMMARY

Four mustard cultivars (cvs) NDR 8501, Rohini, Vardan, Varuna were grown as pot culture at three increased levels of soil salinity (4, 8, 12 dSm⁻¹). The total chlorophyll content, Relative water content (RWC), Photosynthetic rate (P_n) were investigated along with seed yield. The seed yield was maintained in NDR8501 but declined in Vardan at higher salinity levels. All cvs showed an increased seed yield at 4 dSm⁻¹. The reduction in yield at increased salinity was the result of reduction in RWC and P_n rate rather than chlorophyll content. The theme result revealed that, increase in salinity decreased the seed yield in varieties such as Rohini, Vardan and this was not much pronounced in NDR 8501 and Varuna.

Key words : Mustard, Salinity, Chlorophyll, RWC, Seed yield

Indian mustard [*Brassica juncea* (L.) Czern and Coss], the second most important edible oil after groundnut, accounts for nearly one-third of the oil produced in India (Damodaran and Hegde, 2005). India is world's fourth largest edible oil economy after the U.S., China and Brazil, and is the second largest importer after China. India stands third in rapeseed and mustard seed production in the world, with 12 per cent of world's total production grown domestically. The rapeseed/mustard seed produced in India is mainly for domestic consumption, and is mostly consumed in the northern, central and eastern parts of the country. Rapeseed and mustard seeds account for 65 per cent of India's total winter or *rabi* oil crop. Rapeseed and mustard oil content varies between 36 and 42 per cent; of this, average oil recovery is approximately 35 per cent (Srinivasan, 2005). Once the oil is extracted, the remaining part of the seed is used to produce rapeseed/mustard meal, an important source of cattle and poultry feed. This represents a significant source of oil meal in the country, supplying on an average of 3 to 3.2 million tonnes of meal annually. India accounts for seven per cent of global oilseed output; seven per cent of global oil meal production; six per cent of global oil meal exports; six per cent of global vegetable oil production; 14 per cent of global vegetable oil imports; and 10 per cent of global edible oils.

In Indian agriculture sector, oilseeds occupy 13 per

cent of the country's gross cropped area and account for nearly three per cent of gross national product. They also account for 10 per cent of the value of agricultural output produced. Oilseed is cultivated in about 26 million hectares of land. Groundnut, soybean and rapeseed/mustard are the major oilseeds and contribute approximately 80 per cent of production. Other oilseeds produced include sesame, castor, linseed, safflower, sunflower, soybean and niger, along with coconut oil, palm oil and secondary oil crops such as maize and cotton. Rapeseed/mustard seed cultivation is carried out widely in 13 states of India. However, most production takes place in the states of Rajasthan (45 per cent); Uttar Pradesh (13 per cent); Haryana (15 per cent); and West Bengal (8 per cent). Peak production increased to seven million tonnes in 2005–06, up from six million tonnes in 1995–96 and 6.65 million tonnes in 1996–97. This represents an overall increase in acreage and production of rapeseed/mustard seed since 1984–85, reflecting the preferences farmers have for rapeseed/mustard seed over competing crops.

Rapeseed/mustard plants grow all over the world, but their cultivation is mainly confined to India, China, Canada, Germany, France, Australia and the United States. Rapeseed/mustard oil, used primarily in cooking, is a rich source of monosaturated fatty acids, making it a healthier option than most other cooking oils. Over the years, its health advantages have continued to improve, especially with the recent, limited introduction of the "Canola" strain of the seeds. A study by researchers at the Department of Medicine in Safdarjung Hospital, New Delhi, links the increase in heart diseases and diabetes to increased consumption of refined vegetable oils. While such oils contain the dangerous type-6 polyunsaturated fatty acid (PUFA), rapeseed/mustard seed are low in

Correspondence to:

R. DHANDAPANI, Department of Plant Physiology, Indian Agricultural Research Institute, NEW DELHI, INDIA

Authors' affiliations:

S.K.S. PARIHAR, Department of Crop Physiology, C.S. Azad University of Agriculture and Technology, KANPUR (U.P.) INDIA