Effect of nitrogen levels on seed yield and quality parameters in Indian mustard genotypes

R. S. Bisht, R. S.Banga, Ashok Yadav, S. S. Bisht

CCS Haryana Agricultural University, Hisar-125004, India Email: rsbanga@hau.ernet.in

Abstract

Among eight genotypes, RH-9707 produced highest seed yield, oil yield, total protein and stearic acid and lowest erucic acid during 2002-03 and 2003-04 with highest net income of Indian rupees 22123/ha at 80 kg/ha during 2002-03. The significant increase in oil yields due to N was only up to 80 kg/ha. RH-9510 recorded maximum palmitic acid. Palmitic acid stearic acid were not influenced by N levels. Maximum content of oleic, linoleic and eicosenoic acid were recorded in RH-9512, RH9324 and RH-9610 and lowest in RH-9505, RH-9610 and RH-9404, respectively. RH-9505 possessed highest erucic acid. Increasing levels of N resulted in decreased levels of oleic, linoleic acid and eicosenoic acids during the two years study.

Key words: Indian mustard, *Brassica juncea*, genotypes, nitrogen levels, seed yield, quality parameters.

Introduction

Improved mustard genotypes coupled with proper nutritional support are imperative to further boost oilseed production in India. Nitrogen plays an important role in plant metabolism by virtue of being an essential constituent of diverse types of metabolically active compounds seed yield and quality parameters and different mustard genotypes are supposed to be influenced by genetic makeup and N-fertilization. Therefore, the present investigation was planned to study the effect of nitrogen levels on seed yield and quality parameters in different genotypes of Indian mustard.

Materials and Methods

A field experiment was laid out in sandy loan and medium fertility and soil at Research Farm of CCS Haryana Agricultural University, Hisar, India in split plot design with three replications during 2002-03 and 2003-04. Main plots comprised eight genotypes while sub-plots had four N-levels. (Table 1 and 2). The crop was sown in last week of October and harvested in last week of March during both years. Seed samples were taken randomly from the yield of individual plot and oil content was determined by soxhlet extraction method (AOAC, 1960). Protein content in seeds from each plot was worked out by multiplying the N-content in seeds with a conversion factor of 6.25. Then, oil and protein yields (kg ha^{-1}) were worked out by multiplying their respective contents with. seed yield and dividing it with 100. Net return was worked out during 2002-03 only. The fatty acids profile of mustard seeds comprising two saturated fatly acids (palmitic and stearic acids) and five unsaturated fatty acids (oleic, linoleic, linolenic, eicosenoic and erucic acids) was determined as per the method of AOAC (1988).

Results and Discussion

RH-9707 proved highest yielder and significant increase in seed yield was only upto 80 kg N ha^{-1} during both years (Table1). There were much differences in oil content of different genotypes. RH-9512 stood on the top, whereas, RH-9510 was found most interior in oil bearing capacity. In case of protein content, RH-9707 was superior whereas, RH-9610 had least pertinacious seeds. Differences in oil and protein yields were due to differences in seed yield of various genotypes. The increase in oil content was realized only up to 60 kg N ha^{-1} (Table1). These results are in agreement with the earlier findings (Arora *et al*., 1994). Protein content and consequently protein yield continuously increased with successive increase in N-levels. Highest net income of Rs. 22123 ha^{-1} was recorded in RH-9707 at 80 kg N ha^{-1} during 2002-03 (Table 1). RH-9304 proved the next best genotypes.

RH-9707 had relatively highest amount of oleic and linoleic acid and comparatively low erucic acid (Table 2). These are really desirable characteristics from quality point of view and specifically for human consumption. RH-9510 recorded maximum palmitic acid. Maximum content of oleic, linoleic and eicosenoic acid were recorded in RH-9512, RH-9505, RH-9610 and RH-9404, respectively, RH-9505 possessed highest erucic acid. Palmitic and stearic acid were not influenced by N levels. Increasing levels of N resulted in decreased levels of oleic, linoleic and eicosenoic acids during both years. Gupta *et al*. (2002) also reported that increasing N application results into deterioration of oil quality due to increase in erucic acid and decrease in linoleic and oleic acids contents. So, from yield and quality point of view RH-9707 proved the best genotype and N-level up to 80 kg/ha^{-1} appeared to be in this respect.

References

AOAC. (1988). Official and Tentative Methods of Analysis of the Associates of the official Agricultural Chemists, Association of official Agricultural chemists, Washington.

AOAC. (1960). Official Methods of Analysis of the Association of official Agricultural Chemists, Pp, 287, 361.

Arora, A., Singh, V., Das, R.R. (1994). Yield and oil quality of mustard as affected by rates of nitrogen and sulphur in inceptisols. Journal of Oilseeds Research. **11**(2), 273-276.

Gupta, S.K., Chaudhary, M.L., Das, S.N.(2002). Effect of nickel and nitrogen on seed yield, oil content and oil quality of raya (*Brassica juncea L.*) in typic ustochrept and typic haplaquept of Haryana. Journal of Indian Society of Soil Science. **50**(1), 144-146.