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EVALUATION OF ADVANCE RAPSEED LINE HS-98 FOR YIELD ATTRIBUTES AND BIOCHEMICAL CHARACTERS

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Abstract

Studies were conducted to evaluate the locally developed, improved genotype of *Brassica napus* viz., HS-98, and compared its performance with the established commercial varieties viz., Dunkled, Rainbow, Oscar and Altex. The agronomic traits taken into consideration were siliqua per plant, siliqua length, siliqua width, pedicle length and 1000 seed weight. The biochemical parameters included the percentage of oil in the seed, oleic acid, linoleinic acid, protein and seed moisture. The mean squares for siliqua per plant, siliqua length and 1000 seed weight were significant at 1% level of probability, whereas siliqua width and pedicel length were non significant. HS-98 had maximum number of siliqua per plant (156.0) and siliqua length per plant (6.7 cm) and therefore high yielding among all the genotypes. The seed protein was highest (25.1 %) in HS-98 followed by Rainbow, Oscar, Altex and Dunkled.

Introduction

Rapeseed and mustard comprise five known species of the genus *Brassica*. Among which *Brassica rapa* L. and *B. napus* L. are grouped as rapeseed whereas *B. juncea* (L.) Czern. et Coss., *B. carinata* A. Burn and *B. nigra* (L.) Koch are placed in the mustard group. Rapeseed and mustard are traditionally cultivated on rain fed and marginal lands. Majority of farmers cultivate old land races of *Brassica rapa* and *B. juncea* containing high Glucosinolate and Eurucic acid (Khalil *et al*., 1989), which are not only undesirable nutritionally, but the per unit area production of these crops are also very low. The improvement of quality traits is very important for establishing a strong position of rapeseed in the oil crops market and the main selection goals concern, increasing seed yield, modification of seed oil composition and natural antioxidants content and improvement of seed meal quality (Mikolajczyk, 2006). Rapeseed and mustard rank fourth in edible oil after soybean, cotton and groundnut, internationally (Anon., 2004). In the Indo-Pak subcontinent, per unit area production of mustard is three times less (665 kg/ha) as compared to the developed countries, where it's per hectare production is 2180 kg (Ahmad, 2001). Peltonen (2008) studied that the *Brassica* oilseed yield trend has declined in Finland by over 20% during the last 15 years. The results indicated that number of seeds per square meter dominated production of high yields, while single seed weight was not correlated with yield. While high seed numbers were required for production of superior seed yields.

During the year, 2005-06 total cultivated area under rapeseed was 578 acres, producing 188 tons of seed, which yielded 59 tons oil (Anon., 2006). The total availability of edible oil in Pakistan during the year 2004-2005 was 2.764 million tons, which accounted for 31% of the total requirement while the remaining 69% was made available through imports (Anony., 2005). To reduce the import bill and get self-

sufficiency in edible oil production, improved varieties are imperative. Hence efforts were made to introduce improved early maturing genotypes with high seed yield. HS-98 is an outcome of the year's long efforts. This paper communicates some yield and quality attributes of the advance line "HS-98".

Materials and Methods

The research was simultaneously conducted in the Botanical Garden of Government Jehanzebzeb Postgraduate College, Saidu Sharif and Agriculture Research Station North-Mingora, Swat during growing seasons in 2003-2004. Five rapeseed genotypes viz., Dunkled, Rainbow, Oscar, Altex and HS-98 were selected for the study. The genotypes Dunkled, Rainbow, Oscar and Altex are approved commercial varieties of rapeseed. Their seeds were obtained from Agriculture Research Station North, Mingora Swat. The advance line HS-98 was developed through interspecific hybridization (Ahmad, 2001) and its seeds were provided by the principal author. Sowing was done in November in accordance to the approved cultural practices. Randomized Complete Block Design (RCBD) having three replications was used. Each replication consisted of five plots, with the size 5 X 1.8 m and each plot consisted six rows, where the row to row distance was kept 30 cm. Fertilizers were applied @75 kg N and 60 kg P_2O_5 ha^{-1} in the form of Urea and DAP at sowing time. Equal numbers of seeds for each genotype were sown in each plot. Data were recorded for siliqua $plant^1$, siliqua width and silqua length, pedicle length, 1000 seed weight, moisture%, Oleic acid%, Linolenic%, Oil% and protein percentage. The data was statistically analyzed for getting logical conclusions.

Results and Discussion

Means for pods per plant, pods width, pod length, pedicle length, 1000 seed weight, moisture %, oleic acid %, linolenic acid %, oil % and protein % are presented in Tables 1 and 2. Analysis of variance for siliqua $plant^{-1}$ showed significant variation among the genotypes at 1% probability level. From the ANOVA it was also clear that the maximum number of siliqua $plant^{-1}$ (156.0 siliqua $plant^{-1}$) were recorded for genotype HS-98 followed by Altex (147.5 ailiqua $plant^{-1}$) where as the minimum number of siliqua $plant^{-1}$ were recorded for genotype Dunkled (44.3 siliqua $plant^1$). Mean value regarding siliqua width range from 0.4- 1.1 cm. The highest value of mean for siliqua width was observed for Altex (1.1 cm) followed by HS-98 (0.8 cm). Analysis of variance showed non-significant variation at 1% level of significance among the genotypes. Genotype Rainbow, Oscar and Altex have non- significantly different values for pod length. Analysis of variance for pedicle length showed non-significant variation among the five genotypes. 1000 seed weight was highest for HS-98 (19.4 gm) followed by Oscar (17.6 gm). Highest average values for moisture (8 %) and protein (25.1 %) was recorded for the newly developed genotype HS-98. Gunasekera (2006) studied the effects of genotype, environment and their interaction on oil and protein concentrations of seed in mustard and canola. Genotype, environment and their interactions showed large effects on oil and protein concentrations in both species. Khan *et al*., (2006) studied eleven accession of *B. napus*, and reported wide range of siliquae per plant, seed per siliqua and seeds per plant. It was concluded that the early maturing HS-98 is high yielding in terms of seed yield and therefore recommended for registration as a commercial variety.

Table 1. Mean values for different yield parameters in *Brassica*

Genotypes	Parameters				
	Siliqua plant^{-1} (no)	Siliqua width (cm)	Siliqua Length (cm)	Pedicle length (cm)	1000 seed weight (gm)
HS-98	156.0 a	0.8	6.7 a	2.7	19.4 a
Altex	147.5 a	1.1	5.9 b	4.7	7.3 b
Oscar	91.9 b	0.4	5.5 b	2.3	17.6 a
Dunkled	44.3 c	0.5	6.1 ab	2.3	10.1 b
Rainbow	112.3 b	0.4	5.9 b	2.3	8.1 b
L S D at 1%	32.53	-----	0.69	----	1.23

Table 2. Mean values for different linolenical parameters studied.

Genotypes	Moisture % age	Oleic acid % age	Linolenic acid %age	Oil % age	Protein % age
HS-98	8.0	49. 4 A	10.0	45.3 C	25.1 A
Altex	6.4	22.7 D	10.1	50.3 A	20.7 B
Oscar	6.4	61.0 A	9.5	48.9 AB	21.4 B
Dunkled	6.3	54.4 B	9.8	50.3 A	20.1 B
Rainbow	6.2	56.5 AB	10.6	46.9 BC	21.7 B

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