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Screening of Trombay Blackgram Varieties for their Resistance against Pulse beetle, *Callosobruchus maculatus* (F.) under Ambient Conditions

Key words : Blackgram varieties, Resistance, Pulse beetle, *Callosobruchus maculatus*

India is one of the leading countries in pulse production as well as consumption which accounts for 33 per cent of world area and 24 per cent of world production. The production of blackgram in the country is 1.74 million tonnes from an area of 3.26 million hectares, with a productivity of 534 kg/ ha. (Anonymous, 2012). Besides several insect pests attacking blackgram in field, Callosobruchus spp. belonging to the family Bruchidae is very serious pest in storage. Initial infestation starts in the field, where the adult beetles lay eggs on immature pods and the larvae bore through the pericarp and feed concealed within developing seeds (Southgate, 1979). When such seeds are harvested and stored, the insect continues to feed , eventually emerges as a adult and causes secondary infestation which, at times results in total destruction within a period of 3-4 months (Talekar, 1988). The losses in pulses during post harvest handling and storage were 8.5 per cent in India (Pingale et al., 1956) and recorded zero per cent germination due to *C. chinensis* infestation after six months in stored greengram. During storage, pulses undergo some chemical changes due to the presence of insects. They alter the flavour and nutritive value of grains, which reduce the marketability and acceptability of pulses. Prevention of losses in stored products due to insects is of paramount importance. In the present study 5 Trombay blackgram varieties were tested for their resistance against pulse beetle, *C. maculatus*.

Five blackgram varieties *viz*. TU 26, TU 40, TU 72, TU 80 and TU 94-2 were screened for their resistance against pulse beetle, *C. maculatus* during the year 2011-12 at Post Harvest Technology Centre, Bapatla, Andhra Pradesh under ambient conditions. LBG 17 (Krishnaiah) variety was used as susceptible check. The varieties including check were supplied by Nuclear Agriculture and Biotechnology Division, Bhabha Atomic Research Centre, Trombay, Mumbai under All India Coordinated Research Project on Pulses. The culture of pulse beetle was obtained from the stock culture being maintained at Entomology laboratory, Post Harvest Technology Centre, Bapatla. Hundred grains of each variety were taken in 7.5X2.5 plastic vial which constitutes one replication and three such replications were maintained. Two pairs of newly emerged adults (0-24 h old) were released into each replication and allowed for oviposition for 24 h (one day). After 24 h (one day) the adults were removed from the vial.Total number of eggs laid by females were counted under flexible arm illuminated magnifier lens. After counting the eggs, the grains were again kept in vials and the vials were covered with muslin cloth to provide sufficient aeration to the oviposited grains. The vials were observed for adult emergence daily after 30 days of experiment. The adult count was recorded daily from 30 days to till no adult emergence was recorded further. Per cent adult emergence, per cent seed damage and total developmental period was recorded for all the varieties. The total developmental period and growth index of pulse beetle on each variety was calculated by using the formula given below and the data was subjected to statistical analysis

$$\text{Developmental period} = \frac{\text{No. of days x No. of adults emerged}}{\text{Total number of adults emerged}}$$

$$\text{Growth Index} = \frac{\text{Percentage of pupation}}{\text{Larval period}}$$

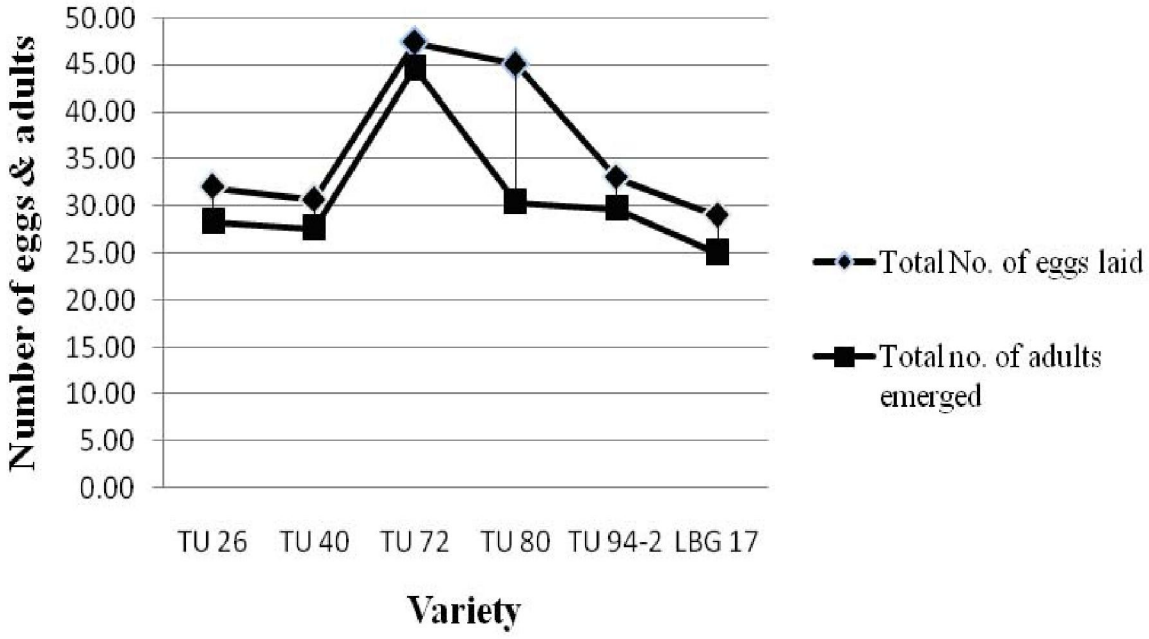
The mean number of eggs laid by 2 pairs of adults in 24 h was 32.00, 30.67, 47.33, 45.00, 33.00 and 29.00 in TU 26, TU 40, TU 72, TU 80,

Table 1. Screening of blackgram varieties for their resistance against pulse beetle, *C. maculatus* under ambient conditions.

Sl. No	Variety	Type & size of grain	No. of eggs laid in 24 h	No. of adults emerged	Per cent adult emergence	Per cent seed damage	Develop mental Period	Growth Index
1	TU 26	Dull, Medium	32.00 (5.32)	28.33 (5.16)	88.92	28.33 (32.14)	36.92	3.07
2	TU 40	Dull, Medium	30.67 (5.56)	27.67 (5.28)	90.11	27.67 (31.76)	38.68	2.94
3	TU 72	Dull Small	47.33 (6.85)	44.67 (6.67)	95.15	44.67 (41.96)	37.63	3.21
4	TU 80	Dull Small	45.00 (6.65)	30.33 (5.52)	70.39	30.33 (33.40)	44.30	1.73
5	TU 94-2	Dull Medium	33.00 (5.78)	29.67 (5.48)	89.98	29.67 (33.02)	37.03	3.10
6	LBG 17	Shiny Large	29.00 (5.33)	25.00 (4.95)	86.71	25.00 (30.00)	38.67	2.83
CD (0.05)			NS	NS	-	NS	NS	-

The values in parentheses are square root and angular transformed values
NS – Non Significant

Figure 1: Screening of blackgram varieties for resistance against pulse beetle, *C. maculates*



TU 94-2 and LBG 17 varieties, respectively (Table 1). The average progeny adults of 28.33, 27.67, 44.67, 30.33 and 29.67 were recorded in TU 26, TU 40, TU 72, TU 80 and TU 94-2 varieties, respectively whereas only 25.0 progeny adults were recorded in check variety LBG 17. The per cent adult emergence was least in variety TU 80 (70.39) wherein only 30.33 eggs were able to complete lifecycle to become adults out of 48.33 eggs laid (Figure 1). The total developmental period was highest in TU 80 (44.30 days) followed by TU 40 (38.68 days), LBG 17 (38.67 days), TU 72 (37.63), TU 94-2 (37.03) and lowest in TU 26 (36.92). Out of the five varieties tested, TU 80 has recorded least per cent adult emergence (70.39) and recorded highest developmental period of 44.30 which, indicated that the variety TU 80 has inhibited the development of larvae and prolonged the lifecycle of the pest. Seed size in the variety TU 80 is less when compared to other varieties tested. This may be one of the reasons for prolonged life cycle and poor emergence of adults in the variety TU 80 when compared to other varieties tested. Also, there might be some growth inhibiting factors in the grain of TU 80 which could be were responsible for least progeny emergence and prolonged developmental period. Talekar and Lin (1992) reported that the resistance in the accessions of V 2709 and V 2802 of greengram and VM 2164 of blackgram was due to antibiosis and not the small size of seed. Therefore, from this study it was concluded that the varieties TU 26, TU 40, TU 72 and TU 94-2 and TU 80 was relatively resistant based on per cent adult emergence and total developmental period.

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