

Evaluation of Pre-Release and Released Varieties of Proso Millet (*Panicum miliaceum* L.) to *Corcyra cephalonica* Stainton (Lepidoptera : Pyralidae) Infestation

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Abstract

Among the different varieties screened against infestation of *C. cephalonica*, variety TNAU-151 offered maximum resistance to pest infestation due to high protein and phenol content (35.37 and 14.62 mg/90 g of proso millet) which was reflected in terms of lesser number of adult emergence as compared to other varieties. Whereas, the variety GPUP-23 suffered maximum infestation by *C. cephalonica* exhibiting highest adult moth emergence and weight loss, it had less protein and phenol content (25.56 and 13.39 mg/90 g of proso millet). Varieties GPUP-22, TNAU-155 and DHPM-50-1-1 are moderately preferred by *C. cephalonica*.

Key words : *Corcyra cephalonica*, Proso millet, Infestation, Varieties.

Proso millet, *Panicum miliaceum* (L.) is a small millet and quick growing crop, particularly suited to a dry continental climate. This is widely grown in USSR, Central Asia, Arabia, Iran, Iraq and Afghanistan, constituting a staple food. Proso millet grains are commonly infested by store pest like the rice meal moth *Corcyra cephalonica* Stainton which is also known to infest cereals like rice, wheat, ragi, maize, sorghum, millets, oil seeds like groundnut, sesamum and olicakes, cotton seed and pulse like red gram, black gram, cowpea with a wide distribution in tropical and sub-tropical countries (1). There have been no reports of this pest on proso millet even though their incidence is noticed. Since millets are important crops in certain regions and serve as food security for the population, it was felt essential to work out basic studies on this pest which would pave way in developing a management program. A study was undertaken with the objective to assess the growth and development of *C. cephalonica* on pre-release and released varieties of proso millet. Stainton (2) first described the adult rice moth from the specimen recorded on dried currants and named it as *Melissoblastes cephalonica*. Later, new genus *Corcyra* was erected by Ragonot (3) to accommo date this insect. Rice moth is recorded not only in India but throughout the world. The first record of its occurrence in India was by

Ramakrishna Ayyar (4). Some workers observed that *C. cephalonica* was a secondary pest, which needs damaged grain for successful establishment (5).

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Methods

Susceptibility of Proso Millet Varieties to C. cephalonica Infestation

Adult Emergence and Loss in Weight. Fresh and cleaned grains of test varieties of proso millet viz. DHPM 50-1-1, TNAU-151, GPUP-22, TNAU-155 and GPUP-23 were used in the present investigation to study the susceptibility to *Corcyra cephalonica* infestation. Known quantity of grain (90 g) was taken in plastic box (7 cm long × 5 cm diameter) for each variety and replicated five times. Three pairs of freshly emerged moths released into each box with the help of aspirator. After introduction of insects the lids were immediately closed. Ventilation was permitted through muslin cloth fitted into the lids. All the boxes were observed for a week to allow opportunity for constant oviposition by moths in each box. After ovipositional period they were removed by a fine brush.

Table 1. Susceptibility of different varieties of proso millet to *C. cephalonica* infestation.

Varieties (V)	Mean adult emergence at different intervals (D)				Over all adult emergence (no.)	Larval weight (g)	Pupal weight (g)
	45	60	75	90			
GPUP-23	5.60	12.00	20.50	35.20	73.30	0.040	0.034
TNAU-155	2.80	7.40	14.40	21.40	46.00	0.028	0.020
TNAU-151	2.20	6.00	11.20	19.00	38.40	0.024	0.016
DHPM 50-1-1	3.40	8.20	16.00	27.00	54.60	0.031	0.024
GPUP-22	4.80	10.20	18.20	31.00	64.2	0.038	0.030
<i>F</i> -test	*	*	*	*	*	*	*
SE ±	0.46	0.63	0.64	0.78	2.13	0.0035	0.0238
CD 5%	1.35	1.8	1.89	2.32	0.29	0.01	0.06
Interaction effect (V × D)							
<i>F</i> -test		*			*		
SE ±		1.1			2.1		
CD 5%		1.7			6.2		

Later all the boxes were kept undisturbed under laboratory conditions for 45 days till the next generation adults started emerging. The observation recorded on the parameters viz. larval weight, pupal weight and number of adults emerged at every fortnight from 45 days after release were recorded and continued up to day 90. Final weight loss of grains was also recorded.

Estimation of Protein and Phenols. This was done by FCR method outlined by Ranjitha (6).

Results and Discussion

The data on susceptibility of different varieties of proso millet to *C. cephalonica* infestation are presented in Table 1. Five proso millet varieties were tested for the susceptibility to *C. cephalonica* infestation viz. GPUP-23, DHPM 50-1-1, GPUP-22, TNAU-155 and TNAU-151.

Over all adult emergence and weight of the larva and pupa due to infestation was more in variety GPUP-23 (73.30) and was moderate in the varieties GPUP-22, DHPM 50-1-1 and TNAU-155. Lowest number of *C. cephalonica* adults emerged when reared on variety TNAU-151 (38.40) followed by TNAU-155 (46.0), DHPM 50-1-1 (54.6) and GPUP-22 (64.2). Weight of the larva and pupa was highest in the variety GPUP-23 and least in the variety TNAU-151 (Table 1). Although it is expected that higher protein content in

the grains should favor the multiplication of insects and thereby show more susceptibility to the pest, in the present findings lowest larval weight and pupal weight were recorded in the variety TNAU-151 which had highest protein content (35.37 g). These results confirm the findings of Jacob et al. (7) content in wheat was positively correlated with fecundity and pest survival and weight loss due to infestation and negatively correlated with average weight of larva.

On the contrary, in the present investigation the variety GPUP-23 recorded with more adult emergence which had lowest protein content (25.56 mg) with lowest phenolic content (13.39 mg) than the rest of the varieties which concurs Sodhi (8) who reported relative susceptibility of different wheat varieties by correlating with wheat protein content. This may be due to the variation in varietal susceptibility in the present investigation. This observation may be due to the reason that higher protein content was associated with higher phenol content which interferes with development.

Present data also suggest that relative susceptibility of varieties to *Corcyra cephalonica* infestation also mainly influenced by phenolic content. The present results are close agreement with Chauhan et al. (9) who reported that the cultivars Delcrest and Harrison special with moderate resistance to leaf spot caused by *H. speciferum* contained greater quantities of free amino acids, carbohydrates and phenolic compounds than susceptible C-304 and T-238.

Table 2. Protein and phenol contents in 90 g of proso millet grains.

Varieties	Protein content (mg)	Phenol content (mg)
GPUP-23	25.56	13.39
GPUP-22	26.55	13.72
TNAU-151	35.37	14.62
TNAU-155	33.21	14.44
DHPM 50-1-1	28.00	13.81
<i>F</i> -test	*	*
SE	0.71	0.12
CD 5%	2.6	0.46

Biochemical Analysis

The data related to biochemical analysis are shown in Table 2.

Protein Content (mg/90 g of Proso Millet Grain). Protein content was highest in the variety TNAU-151 (35.37 mg) followed by variety TNAU-155 (33.21 mg), DHPM 50-1-1 (28.0 mg), GPUP-22 (26.55 mg), and GPUP-23 (25.5 mg) respectively.

Phenols Content (mg/90 g of Proso Millet Grain). Phenol content was highest in the variety TNAU-151 (14.62 mg) followed by variety TNAU-155 (14.44 mg), DHPM 50-1-1 (13.81 mg), GPUP-22 (13.72 mg) and GPUP-23 (13.39 mg) respectively. The present study demonstrated the role of protein and phenolic contents in grains as key factors for determining sus-

ceptibility to store pest.

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