

EVALUATION STUDIES ON JUTE GERmplASM FOR FIELD
RESISTANCE TO STEM WEEVIL, *APION CORCHORI*
MARSHALL (APIONIDAE: COLEOPTERA)

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ABSTRACT

Screening of 152 collections of *capsularis* and 74 collections of *olitorius* jute for resistance to stem weevil under field conditions revealed significant differences among the entries. In *capsularis* type, 7 strains were identified as resistant and 9 as moderately resistant, whereas in *olitorius* there were 6 resistant and 14 moderately resistant strains. The *capsularis* type was more preferred by the pest than *olitorius*.

Key words: Resistance, stem weevil, jute germplasm.

Stem weevil (*Apion corchori* Marshall) causes severe damage to jute crop in the states of U. P., Bihar, West Bengal, Orissa and Assam. Das [1] reported the jute stem weevil to be a major pest. The pest exists throughout the jute season and causes damage to the crop from early stage till harvest. The adult female weevil punctures the stem near the base of the petiole for oviposition. The developing grub tunnels into the pith, damaging the fibre tissue. At the point of injury a knot is formed and such knotty structure causes defect in fibre quality. The loss of fibre due to this pest was estimated and reported to be about 18% [2]. There is little information on resistance/susceptibility of jute germplasm to this notorious pest. Keeping this in view, the jute collections were screened to identify the resistant line(s) against the pest for future breeding programmes.

MATERIALS AND METHODS

The germplasm material comprising 152 collections of *capsularis* and 74 collections of *olitorius* type was grown in randomised block design with three replications during kharif (rainy) seasons at the Jute Research Station, Kendrapara, Orissa. Each collection was grown in a 3-row plot of 3 m length with 30 × 10 cm spacing. With a view to facilitate peak infestation of jute germplasm by the pest, no insecticide spraying was done. Observations on the incidence of stem weevil were recorded regularly at fortnightly intervals, and infestation percentage calculated. Based on the extent of incidence, the germplasm collections were rated for their reaction to the pest according to the following standards: highly resistant (0%), resistant (1-10%),

moderately resistant (11–20%), moderately susceptible (21–50%), susceptible (51–75%), and highly susceptible (76–100%).

RESULTS AND DISCUSSION

Significant differences with regard to the extent of damage were observed among the jute species and their strains. None of these germplasm collections was found free from stem weevil damage (Table 1, 2). However, the results indicated variable host reaction among the *capsularis* and *olitorius* collections. Out of 152

Table 1. Reaction of *capsularis* jute germplasm to stem weevil

Group	Infestation %	Number of entries	Germplasm collections
Highly resistant	0	Nil	Nil
Resistant	1–10	7	JRC 5145, Mogra, Maniksari, Capsularis Hard Stem, Capsularis Yellow Leaf, C 58–9433, C 59–353
Moderately resistant	11–20	9	Broad Leaf, C 55–8520, C 55–466, JRC 320, JRC 890, JRC 978, PM 23–70, CHY 55–447, Bushy Top
Moderately susceptible	21–50	101	JRC 147, JRC 201, JRC 212, JRC 321, JRC 322, JRC 541, JRC 748, JRC 885, JRC 919, JRC 976, JRC 977, JRC 978, JRC 1108, JRC 2102, JRC 3102, JRC 3133, JRC 4444, JRC 4561, JRC 5068, JRC 5087, JRC 5145, JRC 5735, JRC 5854, JRC 6138, JRC 6165, JRC 6170, JRC 6340, JRC 6346, JRC 6382, JRC 7447, JRC 8429, JRC 9020, JRC 9527, JRC 9638, JRC 9677, JRC 9684, JRC 9778, JRC 9786, JRC 9811, JRC 9826, JRC 9829, JRC 9830, JRC 9842, JRC 9846, Deodhali, Zaoping-1, C 50–7160, C 51–81, Fanduk, Cajal, Comilla, Kulkarni, Hewti, Dhaleswari, C 55–78, C 55–185, C 55–494, C 55–8533, C 55–8600, C 55–8606, C 55–8627, C 55–8592, C 56–9171, C 58–9435, C 59–349, C 59–396, C 59–400, CHY 55–487, CHY 55–494, Crumpled Leaf, D–386, Bangkok, BUM–2, Cap–1, Cap–2, Big rough pod, Repand leaf, Halmahera, Kamardani, Zaoping NBR–6, Taichung–1, Ento-cul 1111, Ento-cul 1103, Ento-cul 1114, BUT–1, BUT–7, BUT–8, BUT–9, BUT–17, BUT–18, BUT–24, UPC–142, PM 55–70, PM 73–71, PM 402–76, JRAC–14, Bud–1, Cordate Leaf, C 22, C 34, C 234, C 265
Susceptible	51–75	29	JRC 1, JRC 2, JRC 412, JRC 774, JRC 3121, JRC 3126, JRC 5192, C 55–477, C 55–860, C 55–8694, C 59–346, C 50, C 1410, PM 19–70, PM 33–70, PM 46–70, PM 59–70, PM 67–71, Patchy Albino, D–154, Assam–16, Jap. Green, Chinese 1, Taichung, Zaoping–3, BUM–1, UPC 94, UPC 7716, Nonbitter Leaf
Highly susceptible	76–100	6	JRC 9701, PM 145–70, JRC 889, JRC 13, Red Swine, Narrow Leaf

capsularis strains screened, 7 entries (JRC 5145, Mogra, Maniksari, Capsularis Hard Stem, Capsularis Yellow Leaf, C 58-9433, and C 59-353) were recorded as resistant (1-10% infestation), 9 collections (Broad-Leaf, C 55-8520, C 55-466, JRC 320, JRC 890, JRC 978, PM 23-70, CHY 55-447, and Bushy-Top) as moderately resistant (11-20%), 101 as moderately susceptible, 29 as susceptible, and only 6 entries (JRC 9701, PM 145-70, JRC 889, JRC 13, Red-Swine, and Narrow-Leaf) exhibited more than 75% infestation, hence rated as highly susceptible. The standard varieties like JRC 212, JRC 321, JRC 4444 (Baladev), and JRC 7447 were moderately susceptible.

The collections JRC 412, JRC 5192, JRC 889, JRC 774, Patchy-Albino, Taichung, and D154, reported to be susceptible under West Bengal conditions [3, 4], were again included in the same group when screened at Kendrapara (Orissa). Some Strains like JRC 5145, Capsularis Yellow Leaf, Capsularis Hard Stem, Mogra and Maniksari, categorised as less susceptible [3], were resistant in this investigation.

Table 2. Reaction of *olitorius* jute germplasm to stem weevil

Group	Infestation %	Number of entries	Germplasm collections
Highly resistant	0	Nil	Nil
Resistant	1-10	6	JRO 514, JRO 878-4n, JRO 878, JRO 3372, 059-471, JRO 808
Moderately resistant	11-20	10	JRO 3391, JRO 524, JRO 7648, JRO 7835, PM 356-70, PM 412-70, Wild <i>Olitorius</i> Green, TJ 23, JRO 753, JRO 3331
Moderately susceptible	21-50	49	JRO 620, JRO 632, JRO 632-4n, JRO 3352, JRO 3291, JRO 3454, JRO 3404, JRO 3478, JRO 3491, JRO 3512, JRO 3538, JRO 3570, JRO 3607, JRO 3690, JRO 4362, JRO 4407, JRO 7461, JRO 7615, JRO 7616, JRO 7633, BC 2, BC 4, BC 6, TJ 26, TJ 32, TJ 40, TJ 42, TJ 44, Chinsura Green, Long Narrow Leaf, R 26, Salyout, Clawed Petal, Wild <i>Olitorius</i> Red, Spontaneous Crumpled Leaf, Small Seed, 050-4963, <i>Olitorius</i> Red 1, Black Grey Seed Coat, Foliaceous Stipule, TG, UPO 35, PM 434-70, PM 426-70, PM 150-71, PM 440-70, PM 441-70, PM 186-70, IR-1
Susceptible	51-75	9	Bangkok-1, JRO 3432, JRO 3023, JRO 7635, PM 450-70, PM 432-70, Russian 1, White Stem, 8C 1
Highly susceptible	76-100	Nil	Nil

Only 6 out of 74 *olitorius* collections (JRO 514, JRO 878-4n, JRO 878, JRO 3372, 059-471, and JRO 808) were resistant with 1-10% infestation. Ten collections, i.e. JRO 3391, JRO 524, JRO 7648, JRO 7835, PM 356-70, PM 412-70, Wild *Olitorius* Green, TJ 23, JRO 753, and JRO 3331, exhibited 11-20% infestation and were rated as moderately resistant. In the remaining germplasm, 49 entries were moderately susceptible (21-50%) and 9 susceptible (51-75%). It is interesting to observe that none of the *olitorius* germplasm was placed in the highly susceptible

group, indicating the preference of *capsularis* strains to *olitorius* ones by the weevil. Two collections, JRO 524 and JRO 3690, recorded the lowest and highest susceptibility, respectively, under West Bengal conditions [4]. However, the former was rated as moderately resistant and the latter as moderately susceptible under Orissa conditions. This may be attributed to variability of the pest races in various places, which may cause difference in the resistance pattern. The standard varieties like JRO 878, JRO 7835, JRO 632, and TJ 40 showed differential reaction under Orissa conditions. The first variety was found to be resistant, the second moderately resistant, and the last two moderately susceptible. The observations on mean infestation percentage clearly revealed that both jute species were attacked by stem weevil. However, *capsularis* types were more preferred by the weevil as compared to *olitorius*. The resistant strains identified in the present investigation should be included in the breeding programme.

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