

Plant Volatile Organic Compounds as Chemical Markers to Resistance in Jute against Bihar Hairy Caterpillar, *Spilosoma obliqua* Walker

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Abstract—Jute is the cheapest, most widely grown and extensively used natural bast fibre in the world known as golden fibre, belongs to the family Malvaceae. Among many insect pests, Bihar hairy caterpillar, *Spilosoma obliqua* Walker (Lepidoptera: Arctiidae) is one of the major insect pest and highly polyphagous in nature and it causes yield loss up to 30% in jute crop. The identification of sources of resistance and the mechanism regulating it are the primary approach towards planning for development insect resistant cultivar. In general attempts to develop HPR have been moderately successful due to deficiencies in parent and progeny selection method which is same in case of jute. The resistant jute species (wild) and the susceptible check (cv. JRO-204) were selected for headspace volatile collection and further electrophysiological analyses study. Leaves of different jute species i.e. *C. aestuans*, *C. pseudo-olitorius*, *C. tridens*, *C. trilocularis*, *C. fascicularis* and *C. olitorius* were used for volatile collection. Antennal responses of male and female *S. obliqua* moths to volatile compound extracts from the leaves of jute species plants were analyzed by GC coupled GC-EAD. In case of *C. aestuans*, the behavioral response of *S. obliqua* moth showed antennal response at 0.2mV to a compound at 9.5min with GC-EAD programme. GC-MS analyses of volatiles from *C. aestuans* indicated presence of cyclopentacyclone and decapentane compounds. The female *S. obliqua* moth showed response at 0.05 mV to a compound emitted from *C. pseudo-olitorius* at 9.1min in the GC-EAD studies, even though when the compound was present in very minute quantities. GC-MS analysis of volatiles of *C. pseudo-olitorius* species indicated presence of volatile compounds cyclopentacycloheptane emitted at 8.05 min from the leaves of *C. pseudo-olitorius*. GC-MS analyses of volatile extracts from *C. aestuans* and *C. pseudo-olitorius* species indicated volatiles present in the head space volatile extracts collected from leaves. The repellent compounds, 2- pyrrolidinone, 1-methyl-alpha-pyrrolidinone emitted at 5.75 min and cyclopentacycloheptene emitted at 12.23 min. Similarly in case of *C. pseudo-olitorius*, 2- pyrrolidinone, naphthalene and n-heneicosane were emitted at 5.73, 8.05 and 12.21 min, respectively. The 'volatile assisted selection' will be used as the basis for selection of parents for identification of *S. obliqua* resistance in jute varieties through differential volatile emissions from the jute plants which is the most advanced approach.

Keywords: Jute, *Spilosoma obliqua*, volatile organic compounds, host plant resistance.