Table 2. Carbohydrate and protein content of eri silkworm pupa

Host plants	Carbohydrate (%)	Protein (%)
Kesseru	17.80	55.35
Castor	16.65	51.55
Gulancha	14.55	44.40
Gamari	13.60	39.00
Tapioca	12.65	35.40

*Values are mean of three replications

among treatments in egg recovery on 3rd day. Moreover, maximum egg recovery was recorded on 1st day in all the substrata and it was decreasing as the days increased. The highest egg laying in *kharika* is attributed due to its smooth surface which encourages the female to deposit all the eggs formed in the ovarian follicles. This finding is in agreement with Gupta *et al*. (1990) who recorded the highest oviposition in smooth surface i.e. glasses. Debaraj *et al*. (2003) also reported egg recovery in eri silkworm was the highest on 1st day and it decreased on 2nd and 3rd day. It can be concluded that *kharika* is the most suitable substrata for egg laying and can be utilized at commercial scale. Twigs, paper box, coir rope and nylon bag showed almost equal performance next to *kharika*, so these will be good tools to get maximum egg recovery with low cost and also affordable by farmers.

The carbohydrate and protein contents were the highest in larvae reared on *Kesseru* (17.80 and 55.35%) followed by castor (16.65 and 51.55%), *Gulancha* (14.55 and 44.40%) and *Gamari* (13.60 and 39.00%), while the lowest on tapioca (12.65 and 35.40%) (Table 2). Thus, *Kesseru* is the most suitable host from nutritional point of view. However, due to faster growth rate of larvae feeding on castor makes it preferred choice. Sarmah (2011) also reported the highest content of protein in eri silkworm pupa reared on *Kesseru* plant. Since, eri pupae were consumed as food items by the tribal people of Nagaland, the larvae reared on *Kesseru*, Castor, *Gulancha* and *Gamari* can be utilized.

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(Manuscript Received: April 2012)

NEW RECORD OF *LAWANA CONSPERSA* (WALKER) (HOMOPTERA; FLATIDAE) AS A PEST OF LAC HOST PLANTS

Lac, the only natural resin of animal origin is secreted by the soft bodied lac insect (Homoptera; Coccoidea; Tachardiidae) throughout of its lifecycle. Two genera and 19 species of lac insects have been reported from India and the most common Indian lac insect of commercial importance is *Kerria lacca* (Kerr.), which thrives on the tender twigs of specific host plants. (Sharma *et al.*, 2006). Although a large variety of plants respond as lac hosts, the number of hosts in actual use is relatively small. Thus of the 400 plant species it is commercially cultivated on *Schleichera oleosa* (*kusum*), *Butea monosperma* (*palas*), *Ziziphus mauritiana* (*ber*) and *Flemingia semialata*. Since the productivity of lac depends on availability of healthy shoots on host plants, damage done other by plant pests has direct bearing on it. (Naqvi and Sen, 2008).

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Thus 19 major and 61 sporadic/minor pests of important lac hosts are known (Bhattacharya, 2002). Major sucking pests of the lac host plants reported are *Aonidiella orientalis* Newst, *Tessaratoma javanica* Thunb., *Serinetha augur* F. and *Coptosoma ostensum* Dist.

In this study *Lawana conspersa* (Walker) is reported as a new sucking insect pest. It was found infesting various lac host plants *viz., Flemingia spp*., *B. monosperma* (*palas*), *Cajanus cajan,* (red gram), *Z. mauritiana* (*ber*), and *Dalbergia assamica* (Figs. 1-4). *L. conspersa,* nymph was observed in November-December and adult collected during February-March at the Institute Research Farm, Indian Institute of Natural Resins and Gums, Namkum, Ranchi. The presence of this planthopper was revealed by the long, curled filaments of waxy exudates on the undersides of succulent leaves or on the terminals of branches (Fig. 5). This woolly material often obscured the nymph producing it. Eggs are laid into young twigs

Fig. 1. *L. conspersa* nymph on *Flemingia spp*

Fig. 2. *L. conspersa* nymph on *palas*

Fig. 3. *L. conspersa* adult on red gram

Fig. 4. *L. conspersa* nymph and adult on *ber*

Fig. 5. Damage symptoms caused by *L. conspersa*

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into midribs of leaves. Nymph of the plant hopper jumped like a leafhopper. Nymphs were varying in size depending upon their growth.

L. conspersa has been reported on cocoa and *Bauhinia spp.* (Pena *et al.,* 2002). It was found as a pest of citrus growing areas in Assam (Phukan *et al.,* 1987). *L. conspersa* was recorded as a minor pest of cocoa and completed its life cycle with 104.7 days (Ibrahim and Ibrahim, 1989). David and Ananthakrishnan (2010) mentioned *L. conspersa* as a pest on the ornamental plants, *viz., Zephyranthes vestita, Dahlia sp., Jasminum auriculatum, Eupatorium sp, Notonia grandiflora* and mango inflorescence.

A mature nymph is approximately four mm long and covered with waxy filaments. Wing pads are well developed with black colour transverse line and black spot is present on dorsal side of anal segment. Usually, adults of *L. conspersa* are whitish 10-12 mm in length and 4-5 mm in width at the widest point. Flatids have broadly triangular fore-wings with two orange stripes on the basal portion that are held close to the body in a vertical position and give the insects a wedge-shaped, laterally compressed appearance from above. The forewings have a well developed, transversely veined costal cell and a granulate clavus; the hind wings are hyaline; the hind tibiae normally have two lateral spines in addition to those at the apex.

The hopper feeds on young shoot tips, young leaves and flowers by sucking plant saps and draws energy from the plant, causing dehydration of plant parts; highly infested plants are sticky with honeydew and support thick crusts of sooty moulds caused by excretions of the insect. Besides damaging the host-plant, the waxy exudates of the nymph cover the tender twigs hindering the settlement of lac larvae at the time of inoculation. Thus, it results indirectly in decrease in lac yield. The above species recorded for the first time needs to be investigated for its distribution on different lac-hosts and the extent of damage for devising proper management strategies.

ACKNOWLEDGMENTS

We thank Dr. V.V. Ramamurthy, Principal Scientist, IARI, New Delhi for identifying the planthopper. We also thank Dr. R. Ramani, Director, for providing the facilities.

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(Manuscript Received: May 2012)

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