cetes were among the primary or early colonizers recorded from the fifth day onwards with a few more Deuteromycetes viz. *Alternaria alternata*, *A. tenuissima* and *Cephalosporium acremonium*. A few species like *Aspergillus flavus*, *A. luchuensis*, *A. sydowi* and *Fusarium dimerum* were recorded during the last stages of decomposition. *Absidia repens* occurred only in the beginning but for a short period i.e. between 20th and 35th days of sampling.

The causes of deterioration have so far not been discussed adequately. Kanaujia and Singh[1] studied the successional pattern of fungi associated with decomposing unbloomed spadix of *Pandanus fascicularis*. There may be two possible reasons for unblooming of floral buds: (a) the buds lost their resistance due to some physiological or environmental reasons and started decaying and hence supported a good saprophytic growth of microflora, and (b) due to colonization of buds by different parasitic and/or saprophytic microflora and by their toxin secretions the buds were prevented from blooming. Several workers[2–4] observed that the healthy active buds of some plants act as a primary site for the growth of non-pathogenic and pathogenic bacteria.

It is well known that during colonization of plant parts sugars, starch and protein are decomposed first and hemicellulose, cellulose and lignins are subsequently decomposed. The early appearance of Zygomycetes agrees with the above observation. Similarly members of Deuteromycetes appeared during the last stages of decomposition because they mostly utilize cellulose and hemicellulose. The high frequency of *Mucor hiemalis* and *Absidia repens* is due to their ability to actively utilize the simple sugars from the host and the high rate of mycelial growth and spore production.

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STAGE-SPECIFIC PROTEINS DURING THE ONTOGENY OF *DYSDERCUS KOENIGII* (HETEROPTERA: PYRRHOCORIDAE)

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In insects as in other animals, one of the major biochemical events resulting from cellular activation is the protein synthesis. Haemolymph proteins have been studied in different groups of insects by a number of workers. While most of these studies pertain to holometabolous insects, only a few relate to hemimetabolous insects[1]. One characteristic feature of holometabolous insects is the transformation from larva to adult and during this period there is a selective qualitative control of protein synthesis through a coordinated switching of different sets of genes[2]. This stage-specific pattern of protein synthesis is correlated with changes in gene activity at different phases of the insect's life cycle[2,3]. On the other hand, it has been pointed out that absence of such stage-specific proteins during metamorphosis is characteristic of hemimetabolous insects[4–8]. The present study was undertaken to check the occurrence of stage-specific proteins in another hemimetabolous insect, *Dysdercus koenigii*.

The insects were reared in glass jars at 28 ± 1° C, 70–75% RH and 16 hr photoperiod. They were fed on soaked cotton seeds and water provided in cotton plugged vials. Eggs laid in single heap were removed daily in Petri dishes for hatching. I and II instars being too small to yield adequate haemolymph samples could not be included in these studies. Haemolymph protein pattern (HPP) was studied by the method of Webber *et al*[9]. Gels were fixed in 25% TCA, rinsed in distilled water and stained in 0.25% Coomassie Brilliant Blue R (Sigma).

The HPP of the III, IV, V instar larva and the newly emerged adult is shown in figure 1. The III instar larva yields a total of 11 bands (3–6, 8–10, 15–18), there being no variation during the instar's life. The IV instar larva yields one additional band (7) making a total of 12. This band appears on the first day of the instar's life and continues up to the end of the V instar. The V instar yields two additional bands (11, 12) over the IV instar making a total of 14. Both the new bands appear on the first day of this instar and continue up to its end. In the newly emerged adult bands 3–5, 7, 11, 12 are lost and four new bands (1, 2, 13, 14) appear.

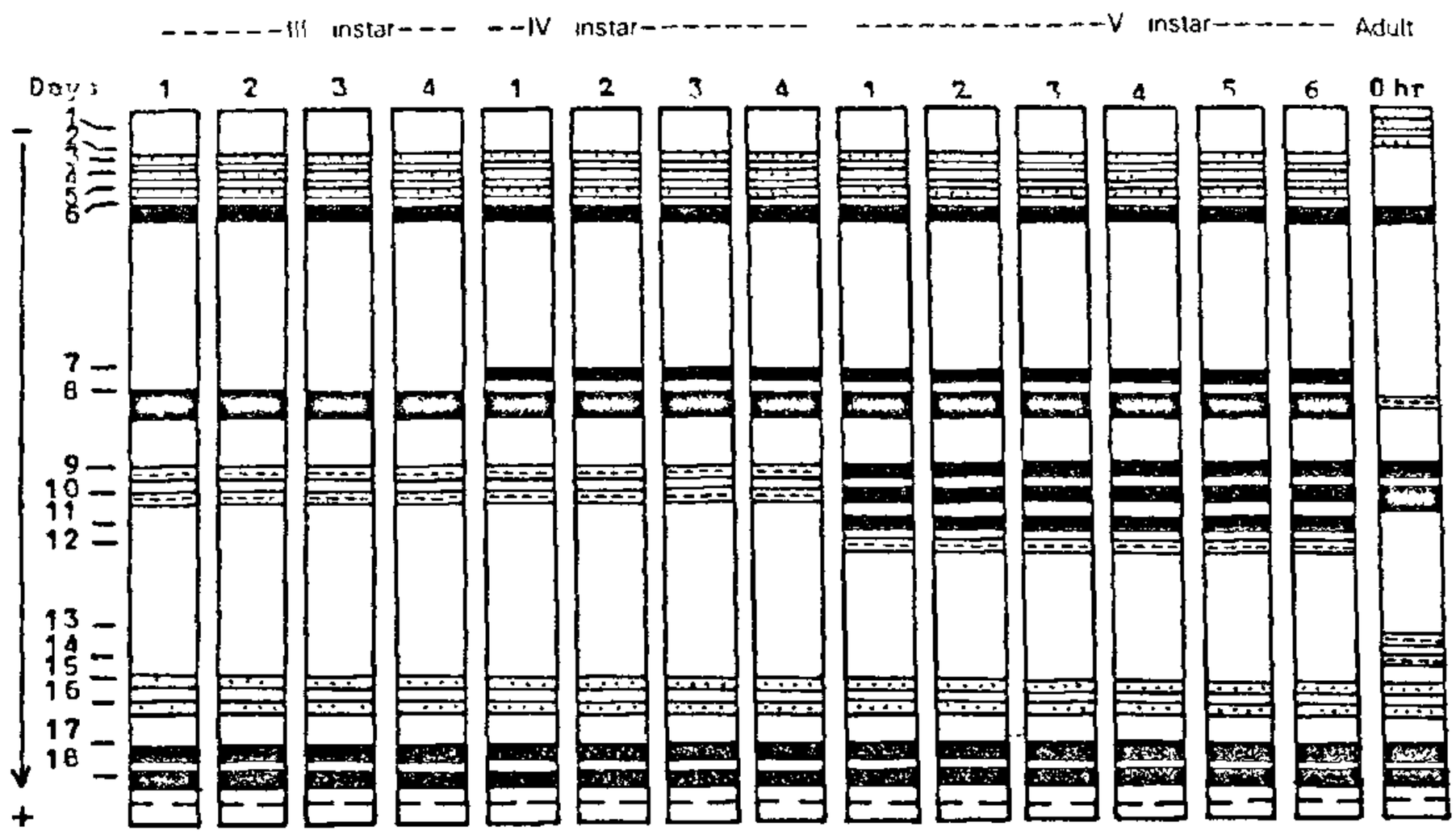

Figure 1. Haemolymph protein pattern during the larval development and at adult emergence in *D. koenigii*.

It has been pointed out[5–8] that the presence of stage-specific proteins is a characteristic feature of holometabolous insects and the absence of such proteins of hemimetabolous insects. Stage-specific proteins appearing only at some particular stage of ontogeny have been reported both in holometabola[10–17] and hemimetabola[18–20]. In the holometabola, proteins specific to the larval stages (larval proteins) and adult stages (adult proteins) have been described earlier[10–14]. Several authors have also described proteins which are associated with diapause[15–17]. In non-hemipteran hemimetabola, a major larval-specific protein has been reported in the cockroach, *Blatta orientalis*[18] and in dictyopterans, termites and mantids[19] and a moult-specific protein in *Locusta migratoria*[20]. *In D. koenigii*, bands 3–5 found in all the stages of the larva but absent in the adult could be regarded as larval-specific proteins, band 7 present in the IV and V instars and bands 11, 12 only in the V instar as instar-specific proteins and bands 1, 2, 13, 14 appearing and persisting throughout the adult life, as adult-specific proteins. Such stage-specific proteins have not been reported in other hemipterans and even though Terendo and Feir[4] have reported their persistence, no matter in a reduced form throughout the adult life, does not entitle them to this category. No specific roles can be assigned to these stage-specific proteins on the basis of the present work. All that can be said is that these proteins are in some way essential for the development of the particular stage in which they appear, and the appearance and disappearance of each one of them at a definite stage implicates a genic control of its synthesis[2,3].

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ON THE IDENTITY OF A LYMANTRIID DEFOLIATOR OF CASHEW AND COCOA IN SOUTH INDIA

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AMONG several species of the genus *Lymantria* Hubner occurring in India, *Lymantria obfuscata* Walker, defoliating alder, apple, apricot, false acacia, oak, pear, peach, plum, poplar, walnut, willow and other fruit trees in Jammu and Kashmir, and in Himachal Pradesh, is considered as a highly destructive pest comparable with *Lymantria dispar* L. in Europe and America. Several parasites of it are known in India[1–7]. Records of its occurrence on cashew and cocoa[3–5] in Tamil Nadu and Karnataka interested the authors while looking for a multivoltine brood of this species for studies on inter-specific competition of parasites of *L. obfuscata* available in Kashmir and Himachal Pradesh. An intensive survey for *L. obfuscata* in Tamil Nadu and Karnataka was made in 1985–86.

Large numbers of a destructive lymantriid larvae were collected on cashew in the plantations of Narimanam, Samakottai and Vriddhachalam (Tamil Nadu), cashew and cocoa in plantations around Vittal (Karnataka) and reared in the laboratory. Both male and female moths and the parasites obtained were referred to the CIE for determination. The moths were identified as *Lymantria ampla* Walker. The other lymantriid pests on cocoa recorded by Premkumar and Radhakrishnan Nair[5] were *Euproctis subnotata* Wlk., *E. guttata* Wlk. and *Dasychira mendosa* HB. Figures of a larva, a gravid female and a male moth of *L. obfuscata* were provided by them. These figures agree with *L. ampla* which is also reported as a pest of cocoa from Sri Lanka[2].

Neonatal larvae of *L. obfuscata* from Kashmir failed to develop on cashew leaves in the laboratory. The male and female genitalia of *L. obfuscata* and of the moth from cashew in the south differ significantly. The braconids *Aleiodes* sp., *Apanteles obliquae* Wilkinson, *Apanteles* sp. (*glomeratus* group), a eulophid *Euplectrus* sp., a chalcid *Brachymeria porthetrialis* Joseph, Narendran & Joy and the tachinids *Blepharipa* sp., *Carcelia* sp., *Exorista* sp. and *Palexorista* sp. were reared from *L. ampla* collected on cashew in Tamil Nadu. The parasite complex of *L. obfuscata* is different with the exception of *A. obliquae*. Around Bangalore, braconids *Apanteles* sp., *Apanteles* sp. (Gr.A) and *Meteorus* sp., tachinids *Blepharella lateralis* Macq., *Blepheripoda zebina* Walker, *Carcelia* sp.,? *buitenzorgiensis* Baranov, *Carelia* sp.,? *C. buitenzorgiensis* Baranov, *Drino* (*Prosturmia*) sp., *D* (*P.*) *lucagus* Walker, *Exorista japonica* Townsend, *E.* sp.,? *larvarum* L. and the ichneumonids *Barichneumon* sp., *Enicospilus* sp., *Pimpla poesia* Cameron, the chalcids *Brachymeria banksi* (Ashmead), *B. deesensis* Cameron, *B. euploeae* Westwood and a eulophid *Trichospilus* sp. parasitised *L. ampla* on *Ficus religiosa* and *Casuarina equisetifolia*. In the light of these observations the record of *L. obfuscata* on cashew and cocoa in the south is obviously erroneous. The damage potential of *L. ampla* to cashew and cocoa warrants consideration of biological control.

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