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# CONSUMPTION AND UTILIZATION OF SENESCENT FLOWERS BY *MYLABRIS PUSTULATA* (COLEOPTERA)

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Food utilization indices of the female *Mylabris pustulata* Thumb (511-512 mg/live wt) were estimated on normal (collected shortly after anthesis at 6 a.m.) as well senescent (collected after 12 hrs of anthesis at 6 p.m.) flowers of *Ipomoea cornea* and *I. tuberosa* for 25 days at 29 $\pm$ 1$^0$C and 70% R.H. The assimilation (AD), gross (ECI) and net (ECD) conversion efficiencies of the beetle decline while consumption (C) and metabolism (M) were increased on senescent flowers of both hosts. Feeding on normal as well as senescent flowers of *I. tuberosa* resulted in high AD. ECI and ECD decreased to a minimum level on senescent flowers. These results were discussed on the basis of reduction in proteins and water in aged flowers.

## INTRODUCTION

Variations in food use efficiencies on senescent leaves (SL) of host plant have been reported quantitatively for herbivorus insects (Marian & Pandian, 1980; Annadurai, 1987; Prasanth Jacob, 1989; Senthamizhselvan & Muthukrishnan, 1989). Such attempts on flower-infesting beetles are limited to normal flowers of their hosts only (Chocklingam & Manoharan *et al.*, 1979; Murugesan, 1988; Krishnan & Jeyachandran, 1995). Manoharan *et al.* (1987) substantiated the relation between the biochemical spectrum of normal flowers of *Ipomoea cornea* (IC) and *I. tuberosa* (IT) and their utilization by female *Mylabris pustulata*. Thus, this study examines the effects of senescent flowers of the above mentioned hosts on food consumption and utilization by *M. pustulata* female.

## MATERIALS AND METHODS

Adult beetles were collected and maintianed as described earlier (Krishnan & Jeyachandran, 1992). Females weighing 511-512 mg live wt from stock culture were used for experiment (Krishnan *et. al.*, 1992; Krishnan & Jeyakumar, 1993). To avoid the errors due to gut contents, beetles were prestarved for 12 hrs before weighing. Flowers of both hosts were collected from the banks of Vaigai river Madurai. Freshly blossomed flowers collected at 6 a.m. (as soon as after anthesis) were considered as NF (normal flower) while those collected after 13 hrs of anthesis (*i.e.* at 6 p.m.) as SF (senescent flower) ( Krishnan *et al.*, 1992a). Beyond 13 hrs after anthesis, the flower becomes unfit for consumption. Food consumption and utilization was assessed as follow: the feed cycles on NF were commenced at 6 a.m. and the unfed flowers and faeces were collected at 6 a.m of the next day. On SF, the cycle is started at 6 p.m. and the unfed flowers and faeces were made at 6 p.m. of the next day. The beetles were fed on weighed quantity of flowers for 25 days (7-8 replicates per flower type). The unfed flowers and the faeces were separated and dried at 600C. The different indices of food utilization were expressed in mg/dry wt and calculated by following Petrusewizc & Macfadyen (1970) and Waldbauer (1968). The protein as well as water content of the SF were estimated by routine methods.

## DISCUSSION

From the data presented in Table I, following inference can be made:(1) increased C on SF's of both hosts, (2) high AD of the beetle on NF and SF of IT, (3) increased M on SF's of both

hosts and (4) decreased ECI and ECD on SF's of both hosts. Further, there is a reduction in percentage of protein and water contents in SF's. The following observations in the present study with reference to NF's are due to higher body weight range of the test beetle (511-512 mg): a) increase in C and b) decrease in A, M, P, AD, ECI and ECD. Similarly, increase in body weight of *Mylabris indica* decreases the A, M, P, AD, ECI and ECD while increase the C on the flowers of *Hibiscus rosasinensis* (Chokalingam & Manoharan, 1979).

**Table I** : Food utilization of fenmale *M. pustulata* (511-512 mg/live wt) on NF and SF of IC as well as IT at 29 ± 1°C and 75% for 25 days.

| Indices | *Ipomoea cornea* | | *Ipomoea tuberosa* | |
|---|---|---|---|---|
| | **NF** | **SF** | **NF** | **SF** |
| Consumption (C) | 1346.8 (8.5) | 1717.0 (6.6) | 961.4 (7.0) | 1358.8 (6.9) |
| Egestion (FU) | 714.2 (4.8) | 1113.0 (5.3) | 507.4 (3.7) | 854 (15.1) |
| Assimilation (A) | 632.6 (8.5) | 604.0 (6.6) | 454 (7.0) | 504.8 (6.9) |
| Production (P) | 87.4 (2.6) | 42.6 (2.0) | 37.6 (3.6) | 18.2 (1.7) |
| Metabolism (M) | 545.2 (1.6) | 561.4 (7.9) | 416.4 (4.8) | 486.6 (12) |
| Approximate Digestibility (AD) | 46.9 | 35.1 | 47.2 | 37.1 |
| Gross conversion efficiency (ECI) | 6.4 | 2.4 | 3.9 | 1.3 |
| Net conversion efficiency (ECD) | 13.8 | 7.0 | 8.2 | 3.48 |
| Protein (%) | 4.88 | 3.62 | 4.64 | 3.48 |
| Water (%) | 89.95 | 67.8 | 88.62 | 57.40 |

Each value is the mean (S.D.) of 7-8 replicates; C, FU, A, P, M in mg/dry wt/ins. and AD, ECI and ECD in percentages; Protein & water for NF's of both hosts from Manoharan *et al.* (1987).

Manoharan *et al.* (1987) reported that IC is nutritionally superior to IT in protein and water contents of the flower. It is confirmed by the following observations of the present study: (i) maximum C, A, and P on NF as well as SF of IC, (ii) high levels of ECI and ECD on both types of flowers of IC. Similarly, high protein, nitrogen and water contents of the flowers of *Luffa cylindrica* increased the C, A and ECD of *M. pustulata* (Murugesan, 1988). The low AD on NF of IC may be possibly due to high feeding rate on this superior host; for instance, the final instar of cabbage butterfly adjusts the high nitrogen of *Brassica oleracea* and the consequent increase in feeding rate by maintaining the AD at low level (Slansky & Feeny, 1979). Similar pattern of utilization (*i.e.* low AD and high feeding rate) was reported by Manoharan *et al.* (1987) for female beetle weighing 400-450 mg live wt on NF of IC.

The reduction in biochemical quality in SF's of both hosts is also evidenced from: (1) increased C as a compensatory mechanism over deficient diet (Muthukrishnan, 1990); for instance, increase in C on SL of the host plants was reported for monarch butterfly larvae (Marian & Pandian, 1980) and *Phaedon cochlearriae* (Taylor & Bordner, 1968), (2) increased

FU on SF's as reported by Marian & Pandian (1980), (3) low AD on SF's of both hosts as observed by Senthamizhselvan & Muthukrishnan (1989) for the larva of *Eupterote mollifera* on SL of *Moringa olifera*, (4) increased allocation of M in order to detoxify the secondary chemicals the secondary chemicals in aged hosts as noted by Marian & Pandian (1980) and (5) low ECI and ECD as a function of increased M. According to Muthukrishnan (1990) in insects, any factor which increases the energy expenditure on M will reduce the ECI and ECD. Similar trends have been reported for herbivorous insects on SL of their host plants (Prasanth Jacob, 1989; Senthamizhselvan & Muthukrishnan, 1990).

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