Poecilocerus pictus and Danaus chrysippus are widely distributed species throughout India. Their nymphs and larvae feed voraciously on the leaves and inflorescence of Calotropis gigantea. In view of the adaptive pattern of P. pictus and D. chrysippus on C. gigantea, a study has been made on the influence of different ages of leaves on feeding, growth and reproduction of both the species.

1. For D. chrysippus, consumption and dietary efficiencies were greater in young compared to old leaves, pointing to dietary water as a deciding factor for lepidoptera. In contrast, P. pictus prefers and maximally utilizes mature leaves of C. gigantea since the higher water content of young leaves may impose volumetric constraints and obstruct digestive physiology of the grasshopper. Both the species when fed on senescent leaves had low consumption index, growth rate and nutritional efficiency measures (ECI and ECD). This may be due to the negative effects of plant toughness, fibre content, nutrients, (protein, carbohydrate, lipid, nitrogen) allelochemicals and also cardiac glycoside level.
2. *P. pictus* reared on mature leaves and inflorescence had shorter nymphal duration, improved longevity and higher fecundity. This may be due to the higher protein and nitrogen concentration, optimum water and cardiac glycoside levels. Dietary nitrogen strongly affects growth and survival of insects. Post ingestive growth performance of insects is determined to a large extent by plant chemical quality and can be indexed by leaf water/nitrogen index. In this study, nitrogen content was higher in mature leaves than on young and senescent leaves which would explain the greater preference for *P. pictus* to mature leaves.

3. Biological studies of *D. chrysippus* on different aged leaves (young, mature and senescent) and inflorescence of *C. gigantea* revealed that the greater growth rate, faster larval development, higher fecundity and maximum longevity were on young leaves rather than on the other ages and inflorescence and are closely parallel with leaf water content. Hence, the decline in the water content and higher cardiac glycoside concentration in mature and senescent leaves were found to reduce the suitability of leaves as food for *D. chrysippus* and also its survival. These results clearly demonstrate that leaf water composition is the important limiting
resource in the case of D. chrysippus to perform growth and reproduction.

4. Insects feeding on protein-rich host plants will be more successful. P. pictus and D. chrysippus fed on mature leaves and inflorescence showed more fecundity and better survival than those fed on senescent leaves, because of the increased protein concentration in the mature leaves and inflorescence. The reproductive performance of insects is influenced by different factors and among them protein-rich nutrient is the single vital factor affecting total egg output in the majority of herbivores. Accumulation of higher phenolics and cardenolides in the senescent leaves may have blocked the bioavailability of nutrients and further inhibited the growth and survival of P. pictus and D. chrysippus.

5. Digestive enzymes were markedly reduced on senescent leaves fed insects of both the species. This indicates that senescent leaves may affect the digestive process. The faecal pellet egestion efficiencies of P. pictus and D. chrysippus in response to various host parts provided a meaningful correlation of compensatory feeding and food utilization against nutrients/non
Reduced nymphal and larval duration and increased longevity on mature leaves (P. pictus) and young leaves (D. chrysippus) may be due to the greater allocation of assimilated food for energy metabolism for growth and reproduction. Further, the changing profiles of protein, carbohydrate and lipids as well as acid and alkaline phosphatases in the male and female reproductive system of P. pictus and D. chrysippus provided additional tool to measure the host plant suitability and further on insect growth and reproduction. Further, the results of present work revealed that the cardiac glycosides levels in different leaf ages of C. gigantea in relation to compensatory feeding behaviour of caterpillar and grasshopper.