CHAPTER I

GENERAL INTRODUCTION

Though the male external genitalia of Coleoptera have been investigated by a number of workers from the standpoint of sclerotic parts (Sharp and Muir, 1912; Newell, 1918; Zia, 1935; Newell, 1941; Jeannel, 1955; Matuda, 1976 etc.), the soft anatomy of the copulatory apparatus has not received enough attention. That this approach can yield significant results became obvious from studies by Verma (1969). In this work the phenomenon of 'retournement' of the aedeagus was described for the first time in a phytophagous form. The progress of 'retournement' could be seen in this study, and the muscular mechanism of the phenomenon was described. Effect of 'retournement' on the tracheal and nervous supply for the aedeagus was also recorded. This work was taken as the basis for the present study. It was planned to study the male copulatory apparatus in phytophaga from the following stand-points.

(i) Tracheal and nervous supply for the aedeagus in a number of phytophagous forms to find out if morphological effects of 'retournement' on this supply were present.

(ii) To study in details the aedeagal musculature in one form and to trace the changes in it in correlation with the 'retournement' of the aedeagus.
(iii) To study comparatively the aedeagal musculature in a number of Rhytophaga in order to find out if there was a fundamental plan underlying the diversity presented in this part of the anatomy.

(iv) To perform experiments feasible in view of available facilities and training in order to discover something more about 'retournement' of the aedeagus.

Results of the present study have been published from time to time as papers (Kumar and Verma, 1971; Verma and Kumar, 1972; Kumar and Verma, 1978; Kumar and Verma; Verma, Kumar and Tiwari).

The contents of each paper have been presented here as a separate chapter. Each chapter, except the 'Conclusions' at the end, is self-contained, in as much as it has its own 'Introduction', 'Material and Methods', 'Observations', 'Figures', and 'Discussion'. The 'Conclusion', which constitutes the seventh chapter, gives a concise account of the general inferences drawn from the present study.