

However, the current year's apical growth was usually untouched (Fig. 4). Even after larvae have left the tree, the white exuviae on the branches implicate *E. ovata* as the principal defoliator. The alder sawfly, *Hemichroa crocea* (Fourc.) was not available for comparison, but defoliation by *E. ovata* can easily be separated from that by two chrysomelid beetles, *Pyrrhalta punctipennis* (Mannerheim) and the alder flea beetle, *Altica ambiens* (LeConte). The beetles chew holes in a leaf, at first leaving even the thinnest veins intact, while *E. ovata* consumes the fine veins (Fig. 3) and often so completely skeletonizes a leaf that only the mid rib and main secondary veins remain (Fig. 5).

A few late instar larvae were found in the field as

late as October 18, 1969. The last instar larva drops without feeding from the tree on the same day as the final moult, and burrows into the soil where it forms a cocoon within 5 cm from the surface. Dissection of 30 cocoons throughout the winter disclosed only prepupae until the first 2 weeks of May when further development became evident.

We found no parasites or evidence of parasitism throughout the study.

Acknowledgments

We thank the Entomology Research Institute, Canada Department of Agriculture for identifying specimens, Mr. B. Jenkins for assistance in the study, and Mr. R. G. Long for photography.

References

- Bouchard, P. 1960. La tenthrède à thorax rouge de l'aune, *Eriocampa ovata* (L) (Hymenoptera: Tenthredinidae). Ann. Soc. Ent. Que. **6**:69.80.
- Bridgeman, J. B. 1878. On parthenogenesis in the Tenthredinidae. The Ent. **11**:191-192.
- Raizenne, H. 1957. Forest sawflies of southern Ontario and their parasites. Can. Dept. Agric. Publ. No. 1009.
- Ross, H. H. 1951. p. 61. In: C. F. W. Muesebeck and K. V. Krombein, Hymenoptera of America north of Mexico, U.S. Dept. Agric., Agric. Mon. No. 2.

RESPIRATION AND CIRCULATION

Compiled and edited by

P. L. ALTMAN and D. S. DITTMER

1971

Federation of Amer. Soc. for
Exptl. Biol., Bethesda, Md.

Pp. xxv and 930.

U.S. \$30.00

The fifth in a series prepared for specialists, this large, heavy book is a stupendous work of organization and system, indexing and filing, a *Handbuch* in the German tradition, of Teutonic thoroughness. Of the 315 contributors and reviewers, 78 are from the U.S.A., 6 from the U.K., 4 from Canada, and the rest from 19 other countries.

The arrangement is in 11 sections. In order, these are: general principles; basic physical and chemical data; thorax and ventilation; airways and gas movement; blood gases; heart and pumping action; vascular system and blood distribution; capillaries and the exchange system; invertebrate respiration; invertebrate circulation; plant respiration and fluid movement. Although the emphasis is thus on man and other vertebrates, the book will be important to anyone in active research on invertebrates and even plants, in the appropriate disciplines. It offers perhaps the swiftest and most effortless means of acquiring background, comparing fresh with

previous work, avoiding duplication and entering the contemporary and established literature. To judge by a sample count on 400 pages there must be close to 6,000 references.

There are 232 tables, some of them enormous, e.g. Table 229, Translocation of growth regulators and herbicides in vascular plants; this is 49 pp. long and includes 369 references for 582 items. Some other tables of direct interest to entomologists concern: inhibition of O_2 consumption; comparative anatomy of circulatory systems; electrical and mechanical properties of cardiac muscle; heart rates; hemolymph volumes; hemocytes; and carbohydrates in hemolymph. The names of the contributors are shown with the tables. Insects are well represented and the information is easily accessible even where it is embedded in large tables, by using the 83-page index and two mirror-image appendixes of 20 pages each, with matching common and scientific names. It is a pleasure to draw attention to this vast accumulation of organized and accessible data, the value and veracity of which is attested by the names of the distinguished compilers, contributors and authors.

A copy is available in the society's library, by courtesy of the Federation of American Societies for Experimental Biology, to whom we are grateful.

H. R. MacCarthy