

oxygen concentration.^{3 5} They usually appear after water temperature exceeds 4°C and disappear after it exceeds 13° to 30°C.

Tadpole shrimps are perhaps most interesting for their sporadic occurrence, both in time and space. They are most numerous and most frequently observed in small prairie pools. Within the range of temporary ponds little habitat preference has been noted.

Their general distribution is documented by Linder, their Canadian distribution by Hartland-Rowe.^{4 2} Four species occur in Canada. In Saskatchewan only two species have been found, *Lepidurus couesii* and *L. lynchi*.² *Lepidurus couesii* has not been previously recorded in Beaver Creek, to my knowledge, nor in any other flowing system in Saskatchewan.

Photography by J. Waddington.

- ¹EDMONDSON, W. T. 1959. *Fresh-water biology* John Wiley and Sons Inc. New York. 1248 p.
- ²HARTLAND-ROWE, R. 1965. *The Anostraca and Notostraca of Canada with some new distribution records*. The Can. Field-Nat. 79:185-189.
- ³HORNE, F. R. 1967. *Effects of physical-chemical factors on the distribution and occurrence of some southeastern Wyoming phyllopodids*. Ecology 48:474-477.
- ⁴LINDER, F. 1952. *Contributions to the morphology and taxonomy of the branchiopod Notostraca, with special reference to the North American species*. Proc. U.S. Nat'l. Mus. 102:1-69.
- ⁵MOORE, W. G. and A. BURN. 1968. *Lethal oxygen thresholds for certain temporary pond invertebrates and their application to field situations*. Ecology 49:349-351.
- ⁶PENNAK, R. W. 1953. *Fresh-water invertebrates of the United States*. Ronald Press Company New York 769 p.
- ⁷ROSENBERG, L. E. 1946. *Fairy shrimps in California rice fields*. Science 104:111-112.
- ⁸WEIZ, P. B. 1966. *The science of zoology*. McGraw-Hill Book Co. Toronto. 875 p.



ALDERFLIES

by D. M. LEHMKUHL*

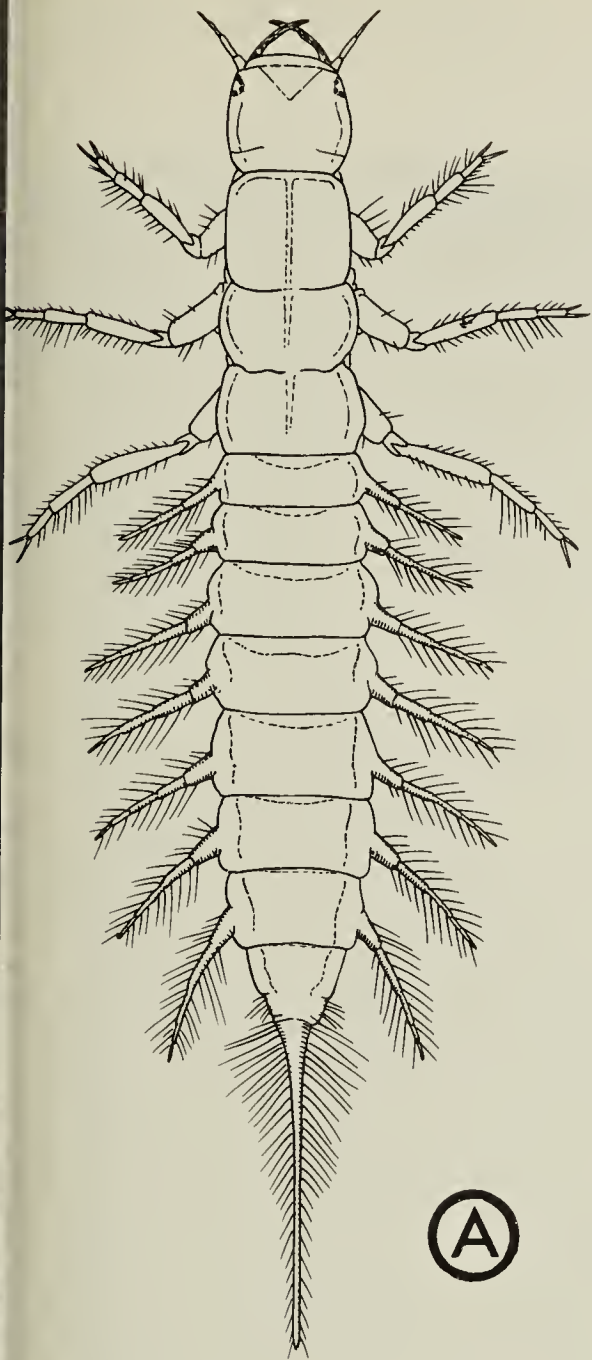
This is the second in a series of articles on aquatic insects based on drawings by A. R. Brook and sponsored in part by the Student Encouragement Committee of the Entomological Society of Canada.

For everyone except fly fishermen, alderflies will be one of the less familiar groups of aquatic insects (Figs. A, B). They are in the Order Megaloptera, or Neuroptera, depen-

ding on which book you use, and comprise the Family Sialidae which is made up of the single genus *Sialis*. (Closely related are the Dobsonflies whose larvae are called hellgrammites by fishermen; they belong to the Family Corydalidae; I have no record of these from the Prairie Provinces).

Adult *Sialis* are blackish rotund in

*Department of Biology,
University of Saskatchewan,
Saskatoon, Sask.



(A)

Fig. A. Larva of *Sialis*.



(B)

Fig. B. Adult of *Sialis*.

sects (Fig. B) about 5/8 of an inch long. Larvae can be recognized by the conspicuous mandibles, the seven pairs of gills on the body segments, and the single "tail" (Fig. A). Adults are usually found walking on or feebly flying through vegetation along streams or near ponds where the larvae develop. Adults probably do not feed at all except on drops of nectar or dew but the larvae are voracious

predators, feeding on any insect larvae or crustaceans they can catch.

While seldom seen, alderflies are by no means rare. There are about 20 known species in North America, half of which occur in Canada. Based on Ross (1937) four species are reported from Alberta (*S. californica* Banks, *S. cornuta* Ross, *S. hamata* Ross, and *S. velata* Ross) while only *Sialis velata* is

known from Saskatchewan and Manitoba.⁵ *S. itasca* Ross occurs in nearby North Dakota.⁵

Specimens in my collection from Saskatchewan are all from the North Saskatchewan River or from the Little Red River at Prince Albert. Alderflies undoubtedly have a much wider distribution in the prairies and specimens from readers would be very useful in determining the complete range.

Studies have shown that larval life lasts 1 or 2 years depending on geographical location, the abundance of food, and when eggs are laid. In Saskatchewan both half- and full-grown larvae have been collected in October and November and adults are present in June. The presence of two size classes in autumn may indicate that the half-grown larvae are in their 1st year, the larger larvae are in their 2nd year and that adults emerge in the 3rd year of life. Obviously, work remains to be done on the group in the prairies.

Alderflies have four stages to the life cycle: egg, larva, pupa, and adult. Upon reaching maturity, larvae leave the water, travel several feet up the shore, dig a tunnel with a chamber at the end, pupate there and, after a few

weeks, transform to the adult stage. After courtship and mating, eggs are laid in neat rows forming a single layered mass on vegetation, logs or structures such as bridges which project over the water. After about 2 weeks, those larvae which escape the attacks of the wasp *Trichogramma*, an egg parasite, emerge from the egg and drop into the water and continue the life cycle.

For those wishing to make collections both larvae and adults may be preserved in alcohol, or adults may be mounted on pins.³

Further reading (available at most University libraries).

¹AZAM, K. M., and N. H. ANDERSON. 1969. *Life history and habits of Sialis rotunda and S. californica in western Oregon*. *Annals Entomological Soc. America* 62:549-558.

²FLINT, O. S. 1964. *New species and new state records of Sialis (Neuroptera: Sialidae)*. *Entomological News* 75:9-13.

³LEHMKUHL, D. M. 1975. *Saskatchewan Damselflies and Dragonflies*. *Blue Jay* 33:18-27.

⁴PRITCHARD, G., and T. G. LEISCHNER. 1973. *The life history and feeding habits of Sialis cornuta Ross in a series of abandoned beaver ponds (Insecta: Megaloptera)*. *Can. J. Zool.* 51:121-131.

⁵ROSS, H. H. 1937. *Nearctic alderflies of the genus Sialis (Megaloptera, Sialidae)*. In: *Studies on Nearctic aquatic insects*. *Bull. Illinois Nat. Hist. Survey*, 21:57-78.



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I named this place Listening Point because only when one comes to listen, only when one is aware and still, can things be seen and heard. Everyone has listening-point somewhere. It does not have to be in the north or close to the wilderness, but some place of quiet where the universe can be contemplated with awe. — *Sigurd F. Olson, Listening Point.*