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Andre Larochelle  
*College Bourget*

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## CARABID BEETLES (COLEOPTERA: CARABIDAE) AS PREY OF NORTH AMERICAN FROGS

André Larochelle

Collège Bourget, C.P. 1000, Rigaud, Québec

In this paper, 62 species of carabid beetles are listed as prey of frogs. Records are from the literature and a stomach contents study.

During the period May to October 1973, I collected and examined the stomach contents of 2 bullfrogs, 45 green frogs, 504 northern leopard frogs and 7 wood frogs from southern Québec in order to learn whether carabid beetles are major or minor prey of frogs. Immediately after capture, the frogs were killed in hot water, their stomachs were removed and the contents emptied into a dish of water. Food items were isolated and determined under magnification. The diet of frogs is determined mostly by relative availability of prey items, and selectivity of prey is a factor of minor importance. According to my study, carabid beetles rate as a minor part of a frogs' diet. However, it should be kept in mind that the majority of the species of the Carabidae are beneficial, feeding on lepidopterous larvae and other pests (Blatchley 1910). In the following list, the number of prey found in the stomachs during my study are indicated in parentheses. Other records are from the literature.

### SPECIES ACCOUNTS

- Undetermined frogs.—New York and Pennsylvania: *Agonum excavatum* Dejean, *A. melanarium* Dejean, *A. tenue* LeConte, *Amara* sp., *A. angustata* Say, *Anisodactylus* sp., *Bembidion impotens* Casey, *B. nigrum* Say, *Bradycellus kirbyi* Horn, *Chlaenius* sp., *Lebia* sp., *Pterostichus* sp., *P. leconteianus* Lutshnik, *P. lucublandus* Say, *P. patruelis* Dejean, *Stenolophus* sp., *S. fuliginosus* Dejean, *Trichotichnus dichrous* Dejean (Frost 1924).
- Southern chorus frog (*Pseudacris nigrita* LeConte).—Alberta: undetermined Carabidae, *Bembidion* sp. (Moore and Strickland 1954).
- Bullfrog (*Rana catesbeiana* Shaw).—Undetermined State: *Dicaelus* sp. (1); Kentucky: undetermined Carabidae (Bush 1959); Missouri: undetermined Carabidae (Korschgen and Moyle 1955; Korschgen and Baskett 1963); Oklahoma: *Calosoma scrutator* Fabricius, *Pterostichus lucublandus* Say (Force 1925); Québec: *Pterostichus luctuosus* Dejean (1).
- Green frog (*Rana clamitans* Latreille).—Illinois: undetermined Carabidae (Jenssen and Klimstra 1966); Kentucky: undetermined Carabidae (Bush 1959); Québec: *Agonum decentis* Say (1), *A. metallescens* LeConte (1), *Amara aenea* DeGeer (1), *A. musculus* Say (1), *Calathus ingratus* Say (1), *Chlaenius impunctifrons* Say (1), *Omophron americanum* Dejean (1), *Pterostichus corvinus* Dejean (1), *P. luctuosus* Dejean (1), *P. melanarius* Illiger (1), *P. patruelis* Dejean (2), *Sphaeroderus lecontei* Dejean (1).
- Wood frog (*Rana sylvatica* LeConte).—Alberta: undetermined Carabidae, *Calosoma* sp., *Pterostichus* sp. (Moore and Strickland 1955); Québec: *Pterostichus pensylvanicus* LeConte (1).
- Northern leopard frog (*Rana pipiens pipiens* Schreber).—Alberta: undetermined Carabidae, *Carabus taedatus* Fabricius, *Harpalus* sp. (Moore and Strickland 1954); Idaho: undetermined Carabidae (Knowlton 1944); New York: undetermined Carabidae (Whitaker 1961); Québec: undetermined Carabidae (10), *Agonum cupripenne* Say (7), *A. extensicolle* Say (1), *A. gratiosum* Mannerheim (1), *A. harrisi* LeConte (2), *A. melanarium* Dejean (5), *A. placidum* Say (2), *Amara* sp. (2), *A. angustata* Say (1), *A. impuncticollis* Say (1), *A. musculus* Say (2), *A. quenseli* Schönherr (1), *A. rubrica* Haldeman (4), *Anisodactylus discoideus* Dejean (2), *A. kirbyi* Lindroth (2), *A. rusticus*

Say (1), *A. sanctaerucis* Fabricius (4), *Bembidion concretum* Casey (1), *B. patruelle* Dejean (1), *Bradycellus nigriceps* LeConte (2), *Carabus maeander* Fischer (1), *C. nemoralis* Müller (1), *Chlaenius impunctifrons* Say (3), *C. lithophilus* Say (2), *C. pensylvanicus* Say (7), *C. sericeus* Forster (2), *C. tricolor* Dejean (3), *Clivina fossor* Linné (5), *Cymindis pilosa* Say (1), *Diplocheila obtusa* LeConte (1), *Elaphrus californicus* Mannerheim (1), *Harpalus affinis* Schrank (16), *H. bicolor* Fabricius (5), *H. erythropus* Dejean (1), *H. herbivagus* Say (1), *H. longicollis* LeConte (2), *H. pensylvanicus* DeGeer (1), *H. pleuriticus* DeGeer (1), *Loricera pilicornis* Fabricius (10), *Notiophilus aquaticus* Linné (1), *Omophron americanum* Dejean (1), *Patrobus longicornis* Say (3), *Pterostichus corvinus* Dejean (2), *P. luctuosus* Dejean (4), *P. lucublandus* Say (6), *P. melanarius* Illiger (12), *Stenolophus comma* Fabricius (2).

Southern leopard frog (*Rana pipiens sphenoccephala* Cope).—Oklahoma: undetermined Carabidae (Force 1925).

Western spotted frog (*Rana pretiosa* Baird and Girard).—Alberta: undetermined Carabidae (Moore and Strickland 1955); Oregon and Washington: undetermined Carabidae (Schonberger 1945); Wyoming: *Agonum* sp., *Amara* sp., *Bembidion* sp., *Calathus* sp., *Elaphrus* sp., *Pterostichus* sp. (Turner 1959).

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