

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MARYLAND 21401

October 22, 1985

Mr. Joe Hautzenroder
Chesapeake Division
Naval Facilities Engineering Command
Washington Navy Yard
Washington, D. C. 20374

Dear Mr. Hautzenroder:

During the summer of 1985 the Department of Navy requested assistance from the Maryland Departments of Natural Resources and Agriculture in determining the cause of a significant dieback of aquatic vegetation within Mattawoman Creek a tributary of the Potomac River adjoining the U. S. Navy Indian Head facility. On July 23, 1985 I accompanied Department of Navy personnel and two State entomologists on a visit to the affected area. Emergent aquatic vegetation was dominated with spatterdock (Nuphar advena). Other plant species within the area include pickerelweed (Pontederia cordata) and arrow-~~arum~~ (Peltandra virginica). ~~A large percentage of the spatterdock was characterized by brown dead leaves.~~ The other aquatic plant species were not similarly affected. A small aquatic beetle, Galerucella nymphaeae was found feeding on the spatterdock leaves. Heavy populations of the larval stage of this insect produced the spatterdock dieback. Attached is a description of Galerucella.

A similar situation was noticed in Dorchester County this past summer. These vegetation dieback occurrences due to insect predation tend to be natural phenomena for which the Naval Station at Indian Head could not be considered responsible.

The size of insect populations generally fluctuates from season to season. The magnitude of this summers' infestation likely reflects a peak in the insect population. An explanation of the long term impacts to the spatterdock can only be speculative. If total defoliation occurs for several successive years, a decline in the spatterdock community would be expected. However, should insect population levels return to normal during the next growing season, the spatterdock would rebound rapidly. Fortunately, insect populations often decline for several seasons subsequent to a peak population. This is usually in response to nature's system of checks and balances.

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Chemical control of the insect is not recommended. This type of control would be difficult, expensive, and harmful to the aquatic environment.

On my future visits to this area I will monitor the situation. Please call me at 269-3877 if you have any questions.

Very truly yours,



Richard J. Ayella
Wetlands Division

RJA:jmb

Encl: Cited

Family PTILODACTYLIDAE

These oval to elongate beetles are brown to black in color and are usually found along the margins of streams. The larvae of some are aquatic but those of others feed upon the roots of grasses or are found in leaf mold. The larvae are of the elongate cylindrical burrowing type. The aquatic forms have the last abdominal segment flattened above and may have gills situated about the anus or on the ventral side of the abdominal segments.

Relationships.—There is considerable confusion as to which genera should be included in this family. Originally it was placed as a subfamily of *Helodidae* and included *Lachnodactyla* and *Ptilodactyla*. On the basis of larval characters, Böving (1931) made it a family and included *Eurypogon* and *Anchytarsus*, formerly placed in *Dascillidae*. He also figured an unassociated larva from China as belonging in this family. Larvae almost identical to that figured have been collected in California, and on the basis of distribution and size have been associated with *Stenocolus*. Another California larva close to *Anchytarsus* on the basis of size has been associated with *Anchycyctis*.

Respiration.—Only the larvae of certain genera are known to be truly aquatic. Whether the adults ever enter the water is not known. The larvae of all genera have the usual spiracles on the mesothorax and the first eight abdominal segments. In addition, two types of gills are found on the aquatic forms. Larvae of *Anchytarsus* and *Anchycyctis* have fingerlike gills in the anal region on the ventral side of the ninth abdominal segment. There are only five such gills in *Anchycyctis*, which would seem insufficient to maintain them below the surface for any length of time. However, the integument has the shining gloss seen in the larva of *Dryops*, which is reported to carry a film of air about the entire body. The *Stenocolus* larva has two tufts each composed of eleven to twelve fingerlike gills on the underside of abdominal segments one to seven.

Habitat and distribution.—Adults of *Stenocolus* are found along streams entering the Sacramento and San Joaquin valleys of California, up to an elevation of 4,000 feet. Associated larvae have been taken in about the same area in streams varying from small creeks to rivers. They burrow in the substratum of the stream, feeding upon the roots of trees and other vegetation. Larvae associated with *Anchycyctis* have been taken in northern California in spring areas and small- to medium-sized rapidly flowing creeks. Presumably they have approximately the same habits as *Stenocolus*.

Key to the Nearctic Genera of Ptilodactylidae

Adults

- Mandibles prominent, acutely margined above (margin often hidden by pubescence), rectangularly flexed at tip, head not retracted; thorax acutely margined *Stenocolus* LeConte 1853
Stenocolus scutellaris LeConte 1853; central California along streams.

- Mandibles not prominent, acute at tip, not acutely margined above, head strongly deflexed; tarsi slender 2
- 2. Antennae slender; middle coxae not more widely separated than the anterior pair; thorax obtusely margined, prosternum moderately long before the coxae *Anchytarsus* Guérin 1843
Anchytarsus bicolor (Melsk.) 1846; New York to Georgia
- Antennae serrate (pectinate in male), moderately long; middle coxae twice as widely separated as the anterior pair; margin of thorax very obtusely rounded, prosternum short in front of the coxae *Anchycyctis* Horn 1880
Anchycyctis velutina Horn 1880; northern California, in springs and rapid streams.

Larvae

- Two tufts of gill filaments on underside of abdominal segments 1-7, 9th segment without prehensile hooklike appendages; submentum not divided (fig. 13:19b) *Stenocolus* LeConte 1853
- Anal area of 9th abdominal segment with short fingerlike gills and 2 prehensile curved appendages covered with short stout spine; submentum divided longitudinally into 3 parts 2
- With only 5 fingerlike gills, 3 anal and 1 on outer side of each prehensile appendage; dorsal flattened apex of 9th abdominal segment with small raised projection *Anchycyctis* Horn 1880
- With 21 fingerlike gills; apex of 9th abdominal segment without projection (fig. 13:19c) *Anchytarsus* Guérin 1843

REFERENCES

- BÖVING, A. G., and F. C. CRAIGHEAD
1931. An illustrated synopsis of the principal larval forms of the order Coleoptera. Ent. Amer., 11:1-351, 125 pls.
- LECONTE, J. L., and G. H. HORN
1883. Classification of the Coleoptera of North America. Smithsonian Misc. Coll., No. 507, xxxviii+568 pp., 70 text figs.

Family CHRYSOMELIDAE

This large family contains one subfamily, Donaciinae, and one species in the subfamily Galerucinae which are closely associated with aquatic plants. The grub-like larvae of Donaciinae (which contains about sixty species) are truly aquatic, and the adults of some species may make short excursions under water. The larvae and adults of *Galerucella nymphaeae* feed only on the upper surface of floating leaves. The Chrysomelidae are characterized by their tarsi which have the fourth segment reduced and hidden between the lobes of the third. They are usually separated from the Cerambycidae by their oval form and shorter antennae, though the Donaciinae resemble the Cerambycidae to some extent in this respect. For this reason they are sometimes called the longhorn leaf beetles. *Galerucella* is a typical chrysomelid.

Relationships.—The Donaciinae have developed their aquatic adaptations independently of the rest of the Chrysomelidae, and for this and other reasons are sometimes placed in a separate family Donaciidae.

Respiration.—The larvae of *Donacia* have the dorsally placed spiracles of the eighth abdominal

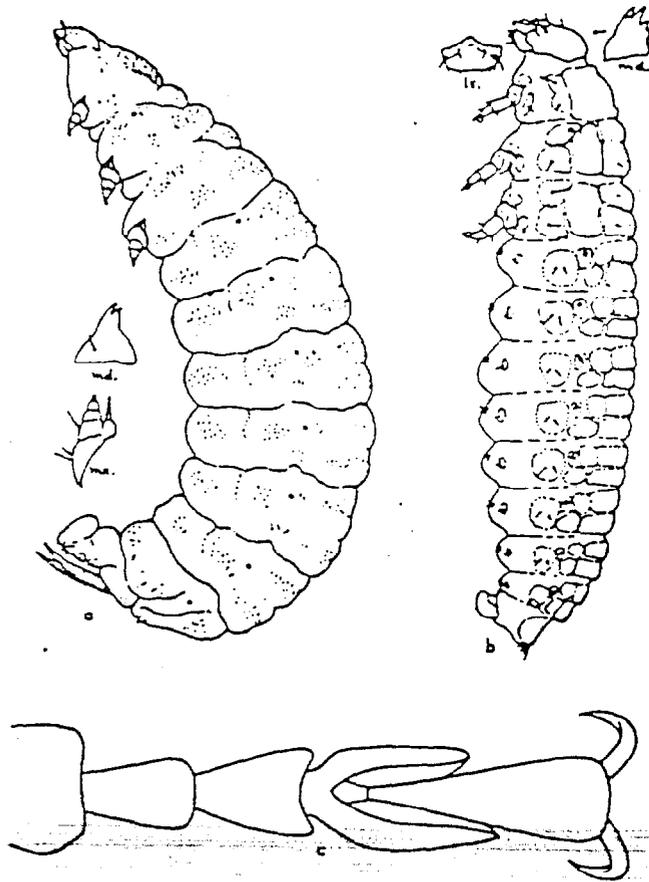


Fig. 13:60. Chrysomelidae, larvae. a, *Donacia* sp., lateral; b, *Galerucella nymphaeae*, lateral; c, *Donacia hirticollis*, adult hind tarsus (a,b, Peterson, 1951; c, Leech, original).

segment biforous and projecting like a pair of spurs (fig. 13:60a). The posterior part of the abdomen is bent beneath the body, so that the spiracles are ventral in relation to the rest of the body. They pierce the stems of aquatic plants and obtain the intercellular air in them. The cocoons are attached to the bases or stems of the same plants and the pupae obtain their oxygen in much the same manner.

Life history.—According to McGaha (1952) mating takes place on the surface of the leaves or in the flowers of the aquatic plant on which *Donacia* feed. The females of some species cut holes in the floating leaves through which they reach the ovipositor to deposit their eggs in concentric circles on the underside of the leaf. Others deposit their eggs under the edge of the leaf. *D. piscatrix* crawls down the flower peduncle to deposit its eggs about 5 cm. below the surface of the water. The larvae feed on the submerged roots, stems, and petioles. The cocoons are constructed on the same part of the plant on which the larvae are found. They are spun from silk produced by glands in the mouth and are free of water inside when completed. The insect may remain in its cocoons for ten months or more. The pupa transforms to the adult long before it is time for the adult to emerge. In due course the end of the cocoon is broken off, and the beetle emerges carrying enough air on the ventral

pubescence and under the elytra to last it until it reaches the surface.

All stages of *Galerucella nymphaeae* occur on the upper surface of the leaves of *Nuphar* or *Nymphaea*. Each female may lay from thirty-six to one hundred and fifteen eggs over a ten to twenty day period. These are deposited in masses of six to twelve each usually at daily intervals. The larvae cannot swim.

Habitat and distribution.—The species of *Donacia* have been observed to feed on a wide variety of aquatic plants, but many of the forms are quite specific. The adults sometimes feed on other plants. The leaves of the preferred plant have not yet reached the surface of the water, but will quickly desert the when the preferred plant becomes available. Some adults feed on pollen. Among the plants used are *Nuphar*, *Nymphaea*, *Myriophyllum*, *Sagittaria*, *Sparganium*, and *Potamogeton*.

Key to the Nearctic Genera of Aquatic Chrysomelidae

Adults

1. Prothorax with a distinct, thin, lateral margin. GALERUCINAE *Galerucella Crotch*
Galerucella nymphaeae (Linnaeus) 1758
- Prothorax without such a margin. DONACIINAE
2. Tarsi dilated, spongy beneath; 5th segment of subequal to or shorter than 2nd and 3rd together *Donacia Fabricius*
- Tarsi not dilated, narrow, glabrous; 5th segment distinctly longer than 2nd and 3rd together *Neohaemonia Latreille*
Neohaemonia nigricornis (Kirby) 1837, Canada, U.S., east of Rocky Mts.

Key to the Nearctic Genera of Aquatic Chrysomelidae

Larvae

1. Dorsal surface of 8th abdominal segment with pair of long spines; abdominal prolegs present (fig. 13:60b). GALERUCINAE *Galerucella Crotch*
- Dorsal surface of segment 8 with a pair of short spines; abdominal prolegs absent. DONACIINAE
2. Color white or cream; dorsum of 7th abdominal segment always rounded transversely and dorsal to posterior in position (fig. 13:60c) *Donacia Fabricius*
- Color green; half of dorsum of 7th abdominal segment posterior and other half flattened and ventral; usually found on *Potamogeton natans* *Neohaemonia Latreille* 18

Key to the California Species of *Donacia*

Adults

1. Sutural bead of elytra approximate to sutural margin throughout entire length. Subgenus *Donacia*
- Sutural bead and sutural margin of elytra diverge at apical 6th. Subgenus *Plateumaris*
2. Entire dorsum pubescent, elytral epipleura not limited dorsally by an elevated ridge; California *pubescens* LeConte 18
- Elytra glabrous, epipleura limited dorsally by a distinct elevated ridge
3. Pronotum finely pubescent; California *hirticollis* Kirby 18
- Pronotum glabrous
4. Hind femora extending to elytral apices, pronotum

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