LAND MOLLUSCA IN THE VICINITY OF WOLFSVILLE,
NOVA SCOTIA

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ABSTRACT

The geographical and ecological distribution of twenty-five species
of terrestrial mollusks in the vicinity of Wolfville, Nova Scotia is de-
scribed. Local paucity of gastropods, as compared with the Nova Scotian
total, is related to the low lime availability of the A subzone of the soils.
Two new records for the province are indicated: *Quicellela vagans* and
*Vertigo bollesiana*. In addition, seven new records are added to the
Nova Scotian mainland total.

INTRODUCTION

The two principal aims of this study have been to deter-
mine the land molluscan fauna in the vicinity of Wolfville
and to provide local distributional and ecological data for the
species present. A significant byproduct of the investigation
has been to establish two new records for the province —
*Vertigo bollesiana* and *Quicellela vagans*. To achieve these ends,
collections of land snails were made at intervals during the
spring and fall of 1961. All but one of the twenty habitats
sampled lie within a ten mile radius of Wolfville (see locality
map). At each station, the microhabitat of each species and
the dominant vegetation type were recorded. The data
obtained has been assembled in the sections of this paper dealing
with gastropod localities and habitats.

LITERATURE REVIEW

The first list of Nova Scotian shells was published in 1857
in the Church Times at Halifax. Compiled by John Robert
Willis, it gave an alphabetical listing of generic and specific names only. Willis’ latest and longest list appeared in 1863, was privately printed but fortunately reprinted in the Nova Scotia Institute of Science Proceedings and Transactions (Ganong, 1890). Fourteen terrestrial species were included and these were arranged phylogenetically. Most of the specimens were apparently collected in the vicinity of Halifax and Dartmouth.

Jones (1877), in the same Proceedings and Transactions, also had published a record of the Nova Scotia mollusca. This, as far as the terrestrial gastropods are concerned, was the same as Willis’ except for certain nomenclatorial changes, possibly one change in identification i.e. Helix hortensis for H. nemoralis and one addition H. pulchella. These species are Cepaea hortensis, C. nemoralis, and Vallonia pulchella in current nomenclature.

In 1906, Campbell published a list of the mollusks of Pictou county. This included ten terrestrial species of which three were new records: Retinella indentata, Triodopsis abbolabris, and Pallifera dorsalis (recent nomenclature). The last two records need yet to be confirmed; the first, if not based on a misidentification has now been confirmed.

Further additions to the Nova Scotian terrestrial gastropod record were not made until 1949 when Ord and Watts published a paper on the slugs of the province. If Campbell’s list is accurate, two rather than four new records (as reported) were added at this time.

MacMillan (1955) who made a survey of the Cape Breton land and freshwater gastropods, has added thirteen species to the provincial list, the largest number since Willis’ time. Excluding subspecies, forty species were reported by him for the island as compared with the twenty-nine, currently known for the mainland.

Twenty-five species have been listed for the Wolfville area. This may be compared with forty-two for Cape Breton (MacMillan, 1955), twenty-seven for New Brunswick (LaRocque, 1961) and sixty-five for Maine (Johnson, 1915). The low figure for New Brunswick can certainly be ascribed to insufficient collecting.
LOCALITY DATA
(refer also to locality map)

Locality 1
backyard lawn, 4 Park Street, Wolfville
Zonitoides arboreus, Cionella lubrica, Vallonia excentrica

Locality 2
narrow floodplain bordering College brook, near intersection of projected extension of Highland Park avenue; young aspens, some willows and alders.

Hygromia hispida, Zonitoides nitidus, Oxychilus cellarius, Retinella electrina, Succinea sp. (1 shell), Deroceras reticulatum, Arion circumscriptus

Locality 3
floodplain with grasses and weeds, near embankment on west side of College brook, immediately north of highway 1

Hygromia hispida, Zonitoides nitidus, Retinella electrina, Cionella lubrica, Deroceras reticulatum, Arion circumscriptus

Locality 4
upland with second growth trembling aspen woods, .25 miles west of Highland avenue on Ridge north of Gaspereau valley

Zoogenetes harpa, Retinella electrina, Cionella lubrica, Vertigo bollesiana

Locality 5
dyke land, Canard river north shore, west side of road; grasses dominant (no trees)

Vallonia pulchella, Cionella lubrica, Vertigo pygmaea

Locality 6
floodplain with grasses and weeds, west side of College brook, a few yards upstream of Dominion Atlantic railway track

Zonitoides nitidus, Retinella electrina, Vitrina limpida, Discus cronkhitei catskillensis, Deroceras reticulatum, Arion circumscriptus
Locality 7
upland, second growth mixed deciduous-coniferous woods, .2 miles west, on Arlington road, of west road to Bennett Bay

*Vertigo gouldi, Cepaea hortensis, Discus cronkhitei catskillensis*

Locality 8
marshy, hummocky, non-wooded ground, west side of road, first west of Grand Pre park; just south of railway track.

*Cionella lubrica, Retinella electrina, Vallonia excentrica*

Locality 9
narrow floodplain of Harding brook, about 1 mile upstream of store at Melanson, with mixed hemlock, spruce and birch

*Euconulus fulvus, Discus cronkhitei catskillensis, Cionella lubrica, Zonitoides arboreus, Retinella indentata, Striatura exigua*

Locality 10
upland with mature hemlock-spruce forest, about 1 mile west of Highland avenue on Gaspereau Ridge road

*Vertigo gouldi paradoxa, Zonitoides arboreus*

Locality 11
outcrop of amygdaloidal basic rock, east side of highway, about 1 mile south of South Alton

*Vertigo pygmaea*

Locality 12
edge of house, 4 Park Street, Wolfville

*Vallonia excentrica, Cionella lubrica*

Locality 13
dominantly coniferous woods, 1 mile from Centreville, on Upper Dyke road

*Euconulus fulvus, Discus cronkhitei catskillensis, Striatura exigua, Zonitoides arboreus, Vertigo ventricosa*
Locality 14
upland with second growth deciduous woods, about .5 miles from White Rock on road to Gaspereau Ridge road

*Striatura exigua, Discus cronkhitei catskillensis, Succinea sp.* (shell only)

Locality 15
wet, young deciduous woods, adjacent to bog in Centreville

*Striatura exigua, Discus cronkhitei catskillensis, Quickella vagans*

Locality 16
floodplain of Gaspereau river, north slope, west side of road at bridge to Wallbrook; marshy plants

*Succinea sp.*

Locality 17
road embankment, grass and weed covered, bordering brook; about .7 miles east of Greenwich on south side of highway 1

*Hygromia hispida, Cionella lubrica, Zonitoides nitidus, Oxyloma decampi gouldi, Deroceras laeve, Deroceras reticulatum, Arion circumstriptus*

Locality 18
old foundation, east side of University avenue, about .1 mile south of Highland Park avenue, Wolfville, Nova Scotia.

*Hygromia hispida, Zonitoides nitidus, Cionella lubrica, Oxychilus cellarius, Deroceras reticulatum, Arion circumscriptus*

Locality 19
small brook with marshy vegetation, flowing into Habitant Creek just west of the first north-south road east of Canning

*Oxyloma decampi gouldi*

Locality 20
cow pasture, bordering roadway trending northwest from Lyons Cove, about 1 mile north of Lower Blomidon

*Arion subfuscus, Arion circumscriptus, Vitrina limpida, Cionella lubrica, Vallonia excentrica, Discus cronkhitei catskillensis.*
The most ubiquitous species of land snail in the vicinity of Wolfville appears to be *Cionella lubrica* which has been found at 50% of the localities. *Discus cronghilei catskillensis*, noted at 35%, comes a poor second.

Whereas several species have been found at single localities, i.e. *Quickella vagans*, *Zoogenetes harpa*, *Vertigo ventricosa*, *Arion subfuscus*, *Vertigo bollesiana* and *Retinella indentata*, the last two are known by single specimens only. These would seem to be the most selective in their habitat preferences or the least adaptable.

The most varied fauna observed was found at locality two. It comprised eight species. The most restricted molluscan faunas were recorded at localities eleven and sixteen. Each contained a single species.

**ECOLOGICAL DATA**

**Family Succineidae**

*Oxyloma decampi gouldi* Pilsbry
- in grass, under matte, on wet brook embankment
- on rushes partly submerged in water of brook

*Quickella vagans* (Pilsbry)
- in and under wet leaf mould, deciduous woods, adjacent to bog

**Family Cionellidae**

*Cionella lubrica* (Mueller)
- under rocks and boards in lawn
- in grass on stream embankment
- on bone fragment in second growth aspen woods
- on drift wood and boards in meadow bordering brook
- under wood in marshy ground
- under started bark and rotting logs, mixed coniferous woods, floodplain of brook
- under boards and logs, in cow pasture bordering road
- under boards, bones, by old foundation

**Family Pupillidae**

*Vertigo bollesiana* (Morse)
- under started bark, second growth Aspen woods

*Vertigo gouldi* (Binney)
under started bark, second growth mixed coniferous-deciduous woods (poplar, birch, spruce)

*Vertigo gouldi paradoxa* Sterki
under started bark, mature hemlock-spruce forest

*Vertigo pygmaea* (Drap.)
in grass and weeds, under boards and logs, floodplain of creek
in crevices, on basic amygdaloidal flow rock

*Vertigo ventricosa* (Morse)
under boards, mainly coniferous woods

**Family Valloniidae**

*Vallonia excentrica* Sterki
under boards and rocks in lawn grass
on cut wood, in grasses on boggy ground
under boards and bogs, along roadway in cow pasture

*Vallonia pulchella* (Mueller)
under boards and logs in grass on floodplain

*Zoogenetes harpa* (Say)
on pieces of wood, some burnt, second growth *Aspen* woods

**Family Endodontidae**

*Discus cronkhitei catskillensis* (Pilsbry)
on damp cardboard in grass and weeds, brook floodplain
on damp paper, second growth mixed coniferous-deciduous woods
on rotten logs, mixed birch, spruce, hemlock woods, narrow floodplain of brook
started bark, mainly coniferous woods
under logs, second growth deciduous woods
in leaf mould, young deciduous woods, adjacent to bog
under boards, cow pasture, adjacent to roadway

**Family Zonitidae**

*Oxychilus cellarius* (Mueller)
in leaf mould and under rotting logs, flood plain of brook
under boards and bones, in grass and weeds, at old foundation
Retinella electrina (Gould)
in leaf mould, under branches and logs, floodplain of brook
on bone fragment, second growth Aspen woods
on damp cardboard in grass and weeds, floodplain of brook
on cut wood, in grass, boggy ground

Retinella indentata (Say)
on rotten logs, hemlock-spruce-birch woods, narrow floodplain of brook

Striatura exigua (Stimp.)
under rotten logs, hemlock-spruce-birch woods, narrow
floodplain of brook
rotten logs, mainly coniferous woods
under logs and in leaf mould, second growth deciduous
woods
in wet leaf mould, deciduous woods, adjacent to bog

Vitrina limpida Gould
on damp cardboard, in grass and weeds, floodplain of
brook
under boards and logs, in cow pasture, adjacent to roadway

Zonitoides arboreus (Say)
under boards and stones in lawn grass
under started hark, hemlock-spruce-birch woods, on
narrow floodplain of brook
under started hark of logs, upland mature hemlock-spruce
woods
in grass and leaf mould, road embankment bordering brook

Zonitoides nitidus (Mueller)
in leaf mould, under branches and logs, Aspen woods,
floodplain of brook
under boards and logs, in leaf mould bordering brook
on damp cardboard, in grass and weeds, floodplain of brook

Family Arionidae

Arion circumscriptus Johnston
under boards and logs in cow pasture next to roadway
in damp leaf mould, grassy and weedy road embankment
bordering brook
under boards, in grasses and weeds by old foundation
Arion subfuscus (Drap.)
under boards and logs in cow pasture next to roadway

Family Limacidae

Deroceras laeve (Mueller)
in damp leaf mould, grassy and weedy road embankment bordering brook

Deroceras reticulatum (Mueller)
under boards in weeds and grasses next to old foundation
in damp leaf mould, grassy and weedy road embankment bordering brook

Family Kaliellidae

Euconulus fulvus (Mueller)
under rotting logs, mainly coniferous woods (upland)
under rotting logs, hemlock-spruce-birch woods, floodplain of brook

Family Helicidae

Hygromia hispida (Linne)
in leaf mould and under logs, Aspen woods on floodplain of brook
in leaf mould and under boards, in grasses and weeds on floodplain of brook
in leaf mould, grassy and weedy embankment bordering brook
under boards, in grasses and weeds, by old foundation

Cepaea hortensis (Mueller)
on damp cardboard, second growth mixed deciduous-coniferous woods (upland)

ECOLOGICAL DISCUSSION

The presence or absence of an organism is to a considerable extent dependent upon environmental factors. Now while these are to varying degrees interrelated, some factors appear to be more restrictive than others. In the case of terrestrial mollusks in Britain, Boycott (1934) noted that local distribution could be directly correlated with available moisture, shelter and lime. Further, food per se, had no influence
either by its quality or quantity on the recurrence of the
gastropods. Snails usually feed on decaying vegetation and
fungi, few feed directly on living plants but some are carni-
vorous. The type of plant cover supplying the decaying
matter is immaterial except for the effects it has on the physical
nature of the habitat i.e. acidity, shelter, moisture retention and
percentage of organic matter.

As noted previously, over forty species of terrestrial mol-
lusks have been reported from Nova Scotia but only twenty-
five in the vicinity of Wolfville. This difference cannot be
entirely attributed to insufficient or inadequate collecting nor
to major climatic differences within the province. A fairly
wide range of habitat types has been examined. Further, a
number of the larger, more conspicuous species have not been
observed locally i.e. polygyrids, anguisspirids, etc. More
likely it is due to the low lime content in the A subzone of the
Wolfville area soils. To test this postulate, I intend to make a
study of the land mollusks of the Windsor area, a region in
part underlain by limestone, gypsum, and anhydrite.

Graham (1957) in his study of the molluscan skin has
emphasized the fact that no mollusk has become truly terres-
trial in the sense that an arthropod or vertebrate is terrestrial,
even though many gastropods live on land. Thus gastropods
are terrestrial in the sense that woodlice and Peripatus are ter-
restrial. They avoid the truly terrestrial conditions and live
in restricted habitats of high humidity. They have never
acquired the water-proof skin which true land life requires —
either by covering the epidermis with a waterproof cuticle (as
in insects) or by covering it with layers of dead cells or scales
(as in vertebrates).

That moisture is important is readily apparent when we
consider our local situation. I found the largest number of
individuals per species and species per habitat in damp locali-
ties i.e. floodplains. Locally these exhibited different dominant
vegetation types, for example grasses and weeds vs. mixed
deciduous woods. The amount of moisture required does vary
considerably from species to species however. Thus Zoni-
toides nitidus has been found only in rather moist situations
but Vertigo pygmaea appears able to thrive equally well in wet
and dry localities. The latter species because of its small size,
was afforded shelter by minute crevices and solution cavities in bare amygdaloidal basic flow rock near South Alton.

Even a combination of good moisture and shelter may not be sufficient for many species, however. Thus the fairly mature hemlock-spruce woods at locality ten, which had a good ground cover of matte and rotting logs and also a good moisture content, revealed few individuals of only two species after diligent search. The very low lime content of the soil and its high acidity made this area unfavourable to abundant molluscan life.

Finally, the importance of man should not be overlooked in connexion with snail ecology. His clearing of the land and cultivation tends to reduce soil moisture in summer and at the same time remove habitat niches. On the other hand, he may increase the lime content of the soil through fertilization thereby making it suitable for some species.

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