THE HERPETOFAUNA OF MINNESOTA: THE STATUS OF MINNESOTA TREEFROGS OF THE *HYLA VERSICOLOR* COMPLEX

R. Earl Olson

Museum Services Associates

a progress report
prepared for the

MINNESOTA NATURAL HERITAGE PROGRAM

June, 1980

ref. 14-1240MHP.III-a

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Introduction

The only species of the Hyla versicolor complex recognized as a member of the Minnesota fauna has been Hyla versicolor, a frog inhabiting the hardwood and coniferous forests, and similar environs in the northeastern three-quarters of the state. Hyla chrysoscelis has recently been resurrected as a valid species name for populations of a sibling species which is superficially almost identical in appearance with members of Hvla versicolor (Johnson, 1966). The writer observed and collected specimens of both of these species in Springvale, Isanti County, Minnesota in 1970. Since that time, that population has been sampled an a few occasions.

The present report considers preliminary field survey data of these members of the Hyla versicolor complex in eastern Minnesota, especially of Hyla chrysoscelis, with the objective of determining the status of that cryptic species in the state.

I carried out the field investigations pertaining to the present report. I am, however, very much indebted to Lee Pfannmuller and Barbara Coffin of the Minnesota Natural Heritage Program, for much assistance in various technicalities, Paul A. Ross and Ronald Van Anda for patient assistance in obtaining stereo tape recordings in in the field in 1972, and, as ever, to Drs. Hobart M. Smith, Philip

W. Smith, and Robert Carcasson for very challenging discussions on the Hyla versicolor complex and related problems, as well as for the many courtesies and informative insights so elusive of description, but which transform the experiences in field and laboratory into moments which chart the course of ones intellectual pursuits.

This work was funded by a grant from the Minnesota Natural Heritage Program.

Taxonomic Notes

This preliminary survey report is not of the nature which is meant to provide an in-depth taxonomic treatment or historical perspective. Nevertheless a few distinctive features are pointed out here for comparison and to indicate aspects upon which to focus in further studies in the state.

The most distinctive feature of these species in the field is the mating call. The pitches and pulse rates differ, that of Hyla chrysoscelis being high-pitched with a rapid buzzing quality, whereas the call of Hyla versicolor is heard as a mellow warble or bleat. Neither of the calls changes inflection. Size differences are slight, specimens of Hyla chrysoscelis in Minnesota being somewhat smaller than those of Hyla versicolor. Chromosomal differences have been pointed out (Bogart & Wasserman, 1972), as have somewhat dubious color differences (Jaslow & Vogt, 1977).

A more important clue to validity of species recognition is the non-continuity of occurence of the two forms. Hyla chrysoscelis is, apparently, absent from several localities where Hyla versicolor is

very common. Continuous range of both types of animals would more likelv hint of brood variants, common genetic aberration with fairly frequent chance of occurence, or some such phenomenon of a non-taxonomic nature.

Field Dates

I first made note of the presence of Hyla chrysoscelis and Hyla versicolor calling in the same pond in Springvale, Isanti Co, (NWNE 11-36-24), on June 20, 1970. At that time I collected specimens of both species. On June 30, 1972 I made further field observations of that population, collecting more specimens, observing size differences in the field, and recording calls by magnetic tape. Since that time. calls of Hyla chrysoscelis have been heard, although much less commonly than those of Hyla versicolor. During midsummer and late summer, calls of dispersed treefrogs in arboreal perches have been exclusively those of Hyla versicolor.

May 8-10, 1980 - southeastern Minnesota, especially along the backwaters of the Mississippi River

May 17, 1980 - eastern central Minnesota, with the object in mind of detecting breeding congresses of Hyla versicolor

May 20-22, 1980 - southeastern Minnesota, in the general vicinity of visitation noted on May 8-10

May 23-25, 1980 - eastern central Minnesota, including a belt from Cambridge westward to Sherburne and Mille Lacs counties; a transect survey for the purpose of detecting range separation between Hyla versicolor and Hvla chrysoscelis

May 30-31 - a transect survey east-to-west in central Minnesota with the purpose in mind of determining the constancy of range separation of populations of Hyla versicolor and Hyla chrysoscelis, and the western extent of the range of the latter

Field Observations

May 21, 1980 - Tonight I began a northward drive from the southeasternmost point in Minnesota, from the Iowa border. Choruses of Hyla versicolor were heard there. Songs of Hyla versicolor were again heard 1.6 mi. S Reno, Houston County. The site is a duckweed-filled cattail marsh; water here is shallow. Males of Hyla versicolor were found calling from seated perches amid cattail clumps, never floating or clinging to objects above ground. Four animals were collected from scattered positions. Two specimens of Rana pipiens were also taken.

May 22 - I had driven westward to Fillmore County during the day, and tonight returned eastward, listening for frog choruses. especially in the valley of Crooked Creek. The first choruses of Hyla versicolor were heard near the Mississippi River bottoms, as I reached a point 4.9 mi. E Freeburg. From the road I crossed a mucky pastureland along a narrow stream for a distance of ½ mile, to an extensive cattail marsh. Males of Hyla versicolor were calling in positions similar to those described for May 21. Two specimens were collected from deep in the marsh.

May 23 - Strong choruses of Hyla versicolor were heard south of Cambridge. Although Hyla chrysoscelis males have been heard just to the west, this chorus was devoid of their sounds.

May 24 - In eastern central Minnesota, I drove westward from Cambridge to check for calling Hyla chrysoscelis, since voices of this species had not yet been heard. In Springvale, Isanti County, where the species had first been discovered in the state, strong mixed choruses of Hyla versicolor and of Hyla chrysoscelis were heard, as was the case 1 mi. W Springvale, Walbo, and in a pond 3.5 mi. E Princeton, Mille Lacs Co. At the last locality, however, the first pure choruses of Hyla chrysoscelis was observed. The pond in which they were calling was just 50 yards west of the pond mentioned above. Standing between the ponds, the mixed chorus could be heard to the east, and the pure chorus of Hyla chrysoscelis to the west. This chorus consisting only of Hyla chrysoscelis was the first I have heard here, and satisfied the suspicion I had, that Hyla versicolor would be replaced by Hyla chrysoscelis as one approaches the western grasslands, if what Blair (1968) suggested about habitat differences were correct.

To the west, two more localities were visited for sonar check; 2 mi. W Princeton, Mille Lacs Co., and 3.5 mi. S Princeton, Sherburne County. At both stations only the calls of Hyla chrysoscelis were heard.

May 25 - Tonight I returned to collect specimens of the Hyla versicolor complex at many of the sites where they were heard last night. The night

is clear and moonlit, with a fair breeze. But the temperature is mild.

(odometer readings)

17498.0 depart Cambridge westward (from town center)

17499.2 large roadside pond - much open water. Along cattail-lined edge and in ponds nearby, Hyla chrysoscelis and Hyla versicolor were calling. Hyla chrysoscelis males were calling while sitting on floating mats of vegetation in the water, among stalks of grasses or cattail. But they were quite exposed, compared with males of Hyla versicolor, which seem to prefer cover: Hyla crucifer also calling.

17512.5 pond - deep water, grass-lined, deep shoreline. Hyla chrysoscelis and Hyla versicolor males calling within a few feet of each other. Males of both sat near edge looking outward toward open water. Hyla crucifer males calling along shore from perches on grass blades. Rana pipiens collected; Bufo americanus calling.

17516.0 PRINCETON

going southward from this point

17520.0 roadside ditch (3 X 30 m); grasses, cattails

Hyla chrysoscelis only calling

collected 1 and 2 small, silent Rana sylvatica.

Bufo americanus calling from location nearby to the east

Frog choruses are considerably poorer than last night. I suspect that the breeze and half-moon have a considerable effect upon the calling intensity. At this location, for instance, only two or three frogs are heard, whereas there were strong choruses last night.

June 2 - A drive westward from Cambridge to attempt to determine something of the nature of the occurence of Hyla versicolor and Hvla chrysoscelis.

17871.0 depart Princeton westward

17883.2 (Benton Co.)

Large pond (100 X 200 m), much open water. scattered hardwood forest dusk; 1 Hyla versicolor, 3 Hyla chrysoscelis calling

(electric fence)

17914.5 (west of St. Cloud)

Large lake (3 or 4 acres)

Hyla versicolor only. unless my ears deceive me; it could be that there are populations following the Mississippi River bottomlands northwards

17917.7 AVON

17945.5 Sauk Centre - southward on rte 71

at south edge of town in slow-moving stream, Bufo americanus calling; they became silent as I enter. and remain quiet

June 3 - a.m.; sunnv, partly cloudy, cool

17971.5 depart Belgrade southward

17980.3 westward on rte. 9

17989.6 Chrysemys picta DOR (2 or 3 more within ½ mi.)

17996.0 Chrysemys picta DOR (Swift Co.)

18010.0 BENSON

I searched in various localities west of Benson today - ponds, river bank, along railroad bed - without any success; strangely there were not even frogs near the water

p.m. eastward from Benson

18016.0 depart Benson eastward

18024.9 Chrysemys picta

18026.9 cattail marsh

Bufo americanus heard in late afternoon; asked permission to collect; The owner has 20,000 baby turkeys, and has raised turkeys a number of years. He has no problem with bullsnakes (nor has he seen them here). Yellow-headed blackbirds quite common here, along with redwings. 1 pr. ruddy ducks seen in marsh.

a male Chrysemys picta taken crossing highway at dusk

A few Pseudacris triseriata began calling from small, shallow, grass-choked pools at dusk. At dark, a Rana pipiens was collected, and a singing Bufo was found perched on a fallen cattail stalk.

18032.4 - 4 or 5 Bufo americanus calling; one collected, the others became, and remained, silent. The toad called from a sitting position amidst a clump of grasses, not floating in open water as I have usually found specimens of this species. Bufo cognatus are calling, I believe, but very faint and very distant.

18034.4 turn around - checked various roads in attempt to find Bufo cognatus; did not

18039.5 (back at position of 32.4 collecting site)

18039.5 southward on gravel road - .2 mi.

clean water marsh, 1 ft. deep; arrowroot, grasses; level ground. Hyla chrysoscelis (1) calling. also Pseudacris triseriata, Bufo americanus, and Rana pipiens.

The treefrog was collected

18040.0 eastward from collecting site

18042.8 SUNBURG

18043.5 muddy cattail-lined small lake; very difficult going in miry bottom. Good chorus of 10-15 Hyla chrysoscelis. Three Hyla collected, 2 floating with forelimbs on grass, 1 perched 1 ft above water on a cattail blade.

18045.1 cattail-lined open lake; Bufo americanus and Hyla chrysoscelis calling. As I approached, the Bufo became silent, and remained so. Two male Hyla chrysoscelis collected, one floating with hindparts in water.

18049.5 deep roadside pond - big, mature cattails - very tough battle going through cattails; scared two ducks off in the darkness.

Deeper water here than usually found for these Hyla (waist deep)

Only Hyla chrysoscelis calling; 2 taken

18056.3 roadside pond; Hyla chrysoscelis and Pseudacris triseriata calling

18058.4 NEW LONDON

18066.6 HAWICK

18068.0 pond;

Hyla chrysoscelis calling - no Hyla versicolor

18070.5 (Stearns Co.)

Hyla chrysoscelis only heard calling

18072.5 PAYNESVILLE

Localities sampled for *Hyla versicolor* complex
(see map on following page)

BENTON COUNTY:
12.2 mi. W Princeton

HOUSTON COUNTY:
1.6 mi. S Reno
0.5 mi. W Reno
N New Albin, Iowa

ISANTI COUNTY:
Cambridge
1.2 mi. W Cambridge
Springvale (6 mi. NW Cambridge)
1 mi. W Springvale
Walbo
Stanchfield

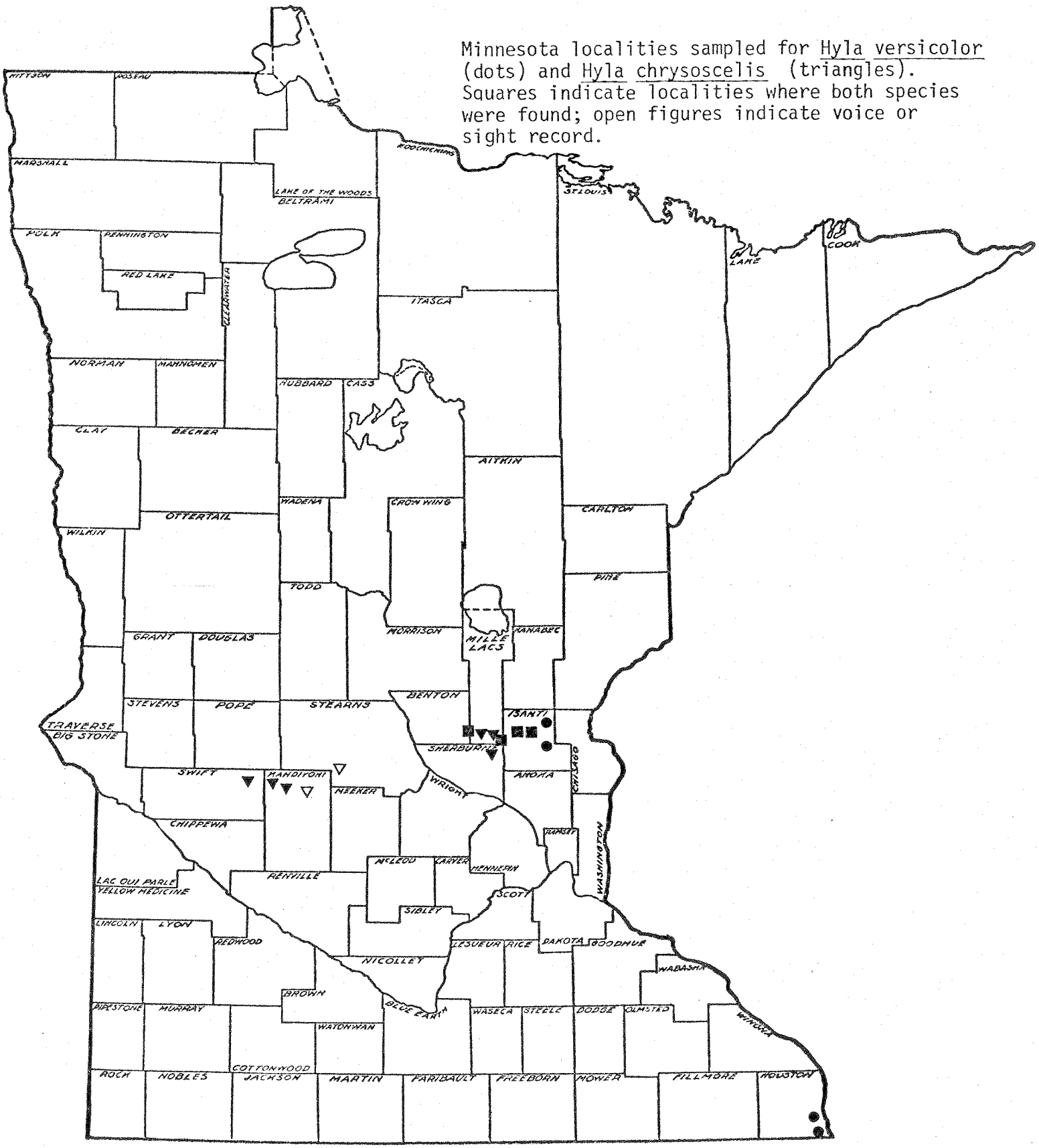
KANDIYOHI COUNTY:
0.7 mi. E Sunburg
2.3 mi. E Sunburg
8.9 mi. W New London
1.4 mi. NE Hawick

MILLE LACS COUNTY:
3.5 mi. E Princeton
2.5 mi. W Princeton

SHERBURNE COUNTY:
4 mi. S Princeton
2.7 mi. S Princeton

STEARNS COUNTY:
3.2 mi. ESE Avon
2 mi. W Paynesville

SWIFT COUNTY:
16.7 mi. E Benson



Minnesota localities sampled for Hyla versicolor (dots) and Hyla chrysoscelis (triangles). Squares indicate localities where both species were found; open figures indicate voice or sight record.

Literature Cited

Blair, W. F. 1958. Mating call in the speciation of anuran amphibians. American Nat. 92:27-51.

Bogart, J. P. and A. O. Wasserman. 1972. Diploid-polyploid cryptic species pairs; a possible clue to evolution by polyploidization in anuran amphibians. Cytogenetics 11:7-24.

Jaslow, A. P. and R. C. Vogt. 1977. Identification and distribution of Hyla versicolor and Hyla chrysoscelis in Wisconsin. Herpetologica 33:201-205.

Johnson, C. 1966. Species recognition in the Hyla versicolor complex. Texas Jour. Sci. 18:361-64.

Suggestions for further studies

In the case of the treefrogs here in question, a thoroughgoing reevaluation of populations within Minnesota is necessary if we are to understand at all the subject being dealt with. It is obvious from the results of this cursory survey that records of and references to Hyla versicolor existing in the literature are of dubious reliability since they deal with two species under a single name.

Several problems are evident: 1)which museums specimens and which reports, or portions thereof, refer to which species? 2)where are the ranges of these species sympatric? allopatric? within the state, 3)what are the habitats shared? unshared?

It is necessary, then, to determine the range status of the two species. In so doing, it will be instructive to determine factors distinguishing the species within the state, such as those of morphologic, habitat, range, and abundance natures.