

Hypotrachyna showmanii, A Misunderstood Species From Eastern North America

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ABSTRACT. – *Hypotrachyna showmanii* Hale has been found to be widely distributed in eastern North America. It contains 5-*o*-methylhiassic acid, other members of the hiassic acid complex, and gyrophoric acid in the medulla, not “horrescens” unknowns and just traces of gyrophoric acid as previously reported. The status of the species, and its relationship to other pustulose species of *Hypotrachyna* and *Parmelinopsis* is discussed. A key to the pustulose *Hypotrachyna* and *Parmelinopsis* species in eastern North America is provided.

INTRODUCTION

When Hale (1976) described *Hypotrachyna showmanii* he considered it to be a rare species that produced esorediate pustules. He also reported the medullary chemistry to include what he termed the “horrescens” unknowns (also found in *Parmelinopsis horrescens* (Taylor) Elix & Hale) as well as traces of gyrophoric acid (Hale, 1976). Following its description, *H. showmanii* was considered a rare species with a restricted distribution and was represented in herbaria by only a few collections none of which were widely distributed.

Recently, lichenologists in eastern North America became aware of a pustulose lichen with atranorin in the cortex that seemed to represent a species of *Hypotrachyna* or *Parmelinopsis*. The taxon bore some resemblance to *Parmelinopsis spumosa* (Asah.) Elix & Hale however differed in several respects (Lendemer & Harris 2004). Since the species is widespread it seemed unlikely to have escaped detection in an area where foliose lichens are so well known. After being continuously puzzled by the taxon both in the field and herbarium we began to wonder if it might represent *Hypotrachyna showmanii* Hale. We also wondered if the chemistry of *H. showmanii* had initially been misinterpreted. Comparison of our material to the figures provided by Hale (1976) when describing *H. showmanii* led us to examine an isotype of the species which proved to be identical to our material.

This study is based primarily on material from the following herbaria: NY, O, OSU, hb. Cleavitt, and hb. Lendemer. All specimens of *H. showmanii* were subjected to TLC analysis (in solvent C or A). The authors also observed the species in the field during numerous trips throughout eastern North America.

DISCUSSION

Among the pustulose species of *Hypotrachyna* and *Parmelinopsis* in eastern North America, *H. showmanii* is the only species that does not produce schizidia or soredia from a breakdown of the pustules. Showman & Flenniken (2004) reported that *H. showmanii* was pustulose-sorediate. However, it seems likely that their report of soredia is a result of the misinterpretation of the fragmentation of the pustules after collecting (e.g., by pressing). True pustules are fragile structures (see Hale 1975), so specimens that have had force applied to them often have areas that appear sorediate. Close examination of these areas reveals them to be crushed pustules rather than actual schizidia or soredia produced from the breakdown of the pustules. It is also possible their concept of *H. showmanii* included material of *H. afrorevoluta*, a pustulose sorediate species, which has recently been reported from North America (Knudsen & Lendemer, 2005).

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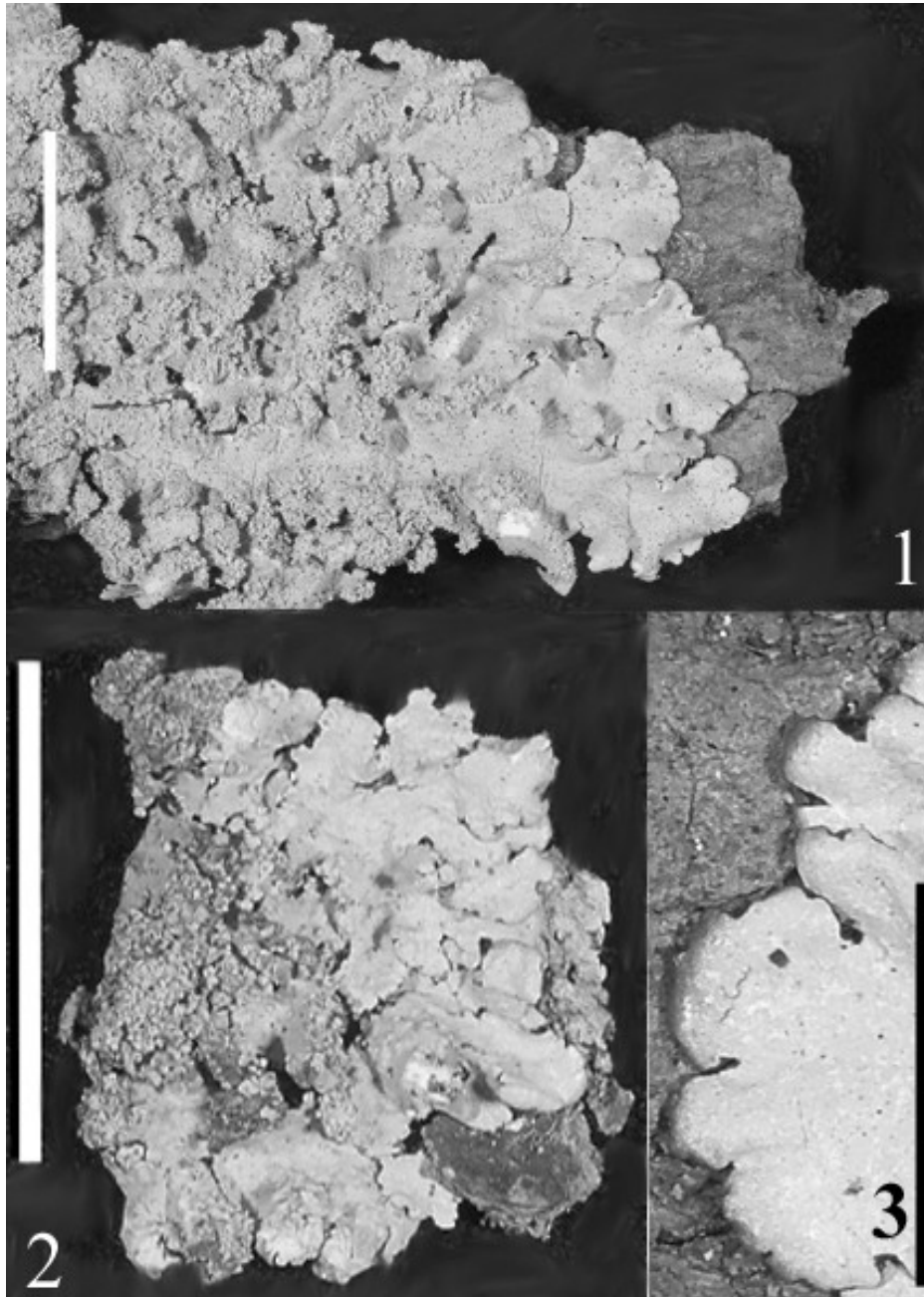


Plate 1. *Hypotrachyna showmanii*. Fig. 1. *Lendemera* 2331. Fig. 2. *Showman* V-12., isotype. Fig. 3. Detail of isotype showing maculate lobe tips and browned lobe margins. Scale bar = 1 cm.

The medullary chemistry of *H. showmanii* is of particular interest because it has been used in the past as a primary character to distinguish it from other superficially similar taxa in eastern North America. While Hale (1976) reported that the medulla of *H. showmanii* contained traces of gyrophoric acid in addition to the “horrescens unknowns” our reexamination of the isotype in OSU revealed that the medulla in fact contains gyrophoric acid in more than just “trace amounts” in addition to members of the hiassic acid complex including 5-*O*-methylhiassic acid. The medullary chemistry of *H. showmanii* is not similar to *Parmelinopsis horrescens* which contains 3-methoxy-2,4-di-*O*-methylgyrophoric acid as the major constituent (Nash & Elix 2003) and thus is C- and KC+ pink/red. Instead it is similar to *H. afrorevoluta* and *Parmelinopsis minarum* in containing significant amounts of gyrophoric acid as well as members of the hiassic acid complex, thus reacting C+ pink/red and KC+ pink/red.

As noted by Knudsen & Lendemer (2005) *H. afrorevoluta* (Krog & Swinscow) Krog & Swinscow, originally described from Africa (Krog & Swinscow 1979), and later reported from many other regions is similar to *H. showmanii*. The species was recently found in North America (Knudsen & Lendemer 2005). It is easily distinguished from *H. showmanii* in having emaculate, revolute lobe tips, sorediate pustules, and a more densely rhizinate underside with the longer rhizines.

As noted by Krog & Swinscow (1979) *H. afrorevoluta* has marginal cilia and following Hale’s generic system the species would not be placed in *Hypotrachyna*. In fact, later authors (Elix & Hale 1987) have placed the species in *Parmelinopsis* which differs from *Hypotrachyna* primarily by the presence of marginal cilia. *Hypotrachyna showmanii* also possesses such marginal cilia, clearly linking it to the material we have previously referred to *Parmelinopsis spumosa* with question (Lendemer & Harris 2004, Harris & Lendemer 2005) as well as to *H. afrorevoluta*. We have chosen to follow Krog & Swinscow (1987) and retain *H. afrorevoluta* in *Hypotrachyna* pending a study using molecular techniques. It seems only logical to treat *H. showmanii* in a similar manner and thus a new combination in *Parmelinopsis* is not made.

CONCLUSION

Hypotrachyna showmanii, has been considered a rare species primarily confined to the Ohio Valley with a C-, KC+ pink/red medulla (Brodo et al. 2001). Hale’s original description (1976) incorrectly reported the medullary chemistry. Examination of the isotype material of *H. showmanii* revealed that instead of having a C-, KC+ red medulla as reported by Hale (1976) and subsequently by Brodo et al. (2001), the species has a C+ pink/red, KC+ pink/red medulla due to the presence of gyrophoric acid in addition to the hiassic acid complex. With the corrected chemistry in mind the material previously referred with question to *Parmelinopsis spumosa* by the authors in several recent checklists is considered conspecific with *H. showmanii*. Thus, the range of *H. showmanii* is extended to include most of north/central eastern North America and the species is considered to be widely distributed but relatively uncommon. To facilitate the accumulation of additional records we have provided a key (appendix I) to the pustulose species of *Hypotrachyna* and *Parmelinopsis* in eastern North America including *H. showmanii* and *H. afrorevoluta*, which was recently reported as new to North America. Additionally, a selection of specimens documenting the newly established range of *H. showmanii* is provided (appendix II).

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APPENDIX I

KEY TO PUSTULOSE HYPOTRACHYNA & PARMELINOPSIS IN EASTERN NORTH AMERICA

1. Cortex UV+ yellow (lichexanthone); medulla K+ brownish-purple (lividic acid complex)...*H. osseoalba* (Vain.) Park & Hale
1. Cortex UV- (atranorin); medulla chemistry various.....2

2. Medulla PD+ orange-red (protocetraric acid), with yellow-red/orange pigment; high elevation southern Appalachians.....*H. croceopustulata* (Kurok.) Hale
2. Medulla PD- (lacking protocetraric acid), pigment absent or dull yellow; distribution various.....3

3. Medulla white, K+ & KC+ brownish-purple, C-, (lividic acid).....*H. pustulifera* (Hale) Skorepa
3. Medulla white or pigmented, K-, KC+, C± (chemistry various).....4

4. Medulla C-, KC+ red (alectoronic acid present).....*H. densirhizinata* (Kurok.) Hale
4. Medulla C+ pink/red or orange, KC+ pink/red or orange.....5

5. Medulla C+ orange (barbatic acid agg.).....*H. laevigata* (Sm.) Hale
5. Medulla C+ pink/red.....6

6. Medulla C+ red (lecanoric acid and evernic acid); thallus pustulose-schizidiate; Appalachians/Ohio Valley.....*H. taylorensis* (M.E. Mitch.) Hale
6. Medulla C+ pink (gyrophoric acid).....7

7. Pustules absent (eroding soralia present); lobe tips revolute; medulla with gyrophoric acid and hiassic acid complex.....*H. revoluta* (Flot.) Hale
7. Pustules present, sorediate or not; lobe tips various; medulla with gyrophoric acid ± hiassic complex.....8

8. Lobe tips maculate; thallus pustulose; medulla white, with gyrophoric acid + hiassic acid complex.....*H. showmanii* Hale
8. Lobe tips emaculate; thallus pustulose-sorediate; medulla white or yellowish, with gyrophoric acid ± hiassic acid complex.....9

9. Pustules subterminal; w/o hiassic acid complex...*H. oostingii* (Dey) Hale
 9. Pustules laminal; hiassic acid complex present or absent.....**10**
10. Medulla white, with gyrophoric acid + hiassic acid complex;
 lobe tips revolute; absent from SE coastal plain.....
*H. afrorevoluta* (Krog & Swinscow) Krog & Swinscow
10. Medulla yellowish, with gyrophoric acid ± hiassic acid
 complex; lobe tips not revolute; SE coastal plain.....
*P. "spumosa"* (Asah.) Elix & Hale

APPENDIX II

SELECTED SPECIMENS EXAMINED

The selected cited specimens below are intended to establish the newly revised geographic range of *H. showmanii*. Herbarium citations follow *Index Herbariorum* and the herbarium of the first author is abbreviated (hbL). A collection of *H. showmanii* will be distributed by the first author in the next fascicle of *Lichens of Eastern North America*.

Selected Specimens Examined. – **USA. CONNECTICUT.** LITCHFIELD CO.: Holleran Swamp Preserve, *Harris 47967* (NY). **KENTUCKY.** HARLAN CO.: Profile Rock, Kentenia State Forest, *Harris 27161* (NY). LETCHER CO.: Bad Branch Nature Preserve, *Harris 27073* (NY). **MASSACHUSETTS.** HAMPSHIRE CO.: Chesterfield, *Rolih s.n.* (NY). **NEW JERSEY.** BURLINGTON CO.: Wharton State Forest, *Lendemer 961 & Smith* (hbL). **NORTH CAROLINA.** GRAHAM CO.: Nantahala National Forest, Stratton Ridge, *Harris 40995* (NY). MACON CO.: Nantahala National Forest, along Jones Creek, *Harris 41178* (NY). **OHIO.** FAIRFIELD CO.: Rhododendron Hollow State Nature Preserve, *Showman s.n.* (OSU). GALLIA CO.: sine loc., *Showman s.n.* (OSU). HOCKING CO.: sine loc., *Showman s.n.* (OSU). LAWRENCE CO.: Decatur Township, *Showman s.n.* (OSU). MEIGS CO.: Mt. Herman Churchyard, *Showman s.n.* (OSU). SCIOTO CO.: Old Hoffer Hill Church, *Showman s.n.* (OSU). VINTON CO.: Mead-Raccoon area, near Oreton Fire Tower, *Showman V-12* (OSU). **PENNSYLVANIA.** CARBON CO.: Hughes Swamp, *Lendemer 2384 & Rhoads* (hbL). LUZERNE CO.: Rickets Glenn State Park, *Lendemer 2231 & Macklin* (hbL, NY). PIKE CO.: Delaware Water Gap National Recreation Area, *Lendemer 2622 & Harris et al.* (hbL). SULLIVAN CO.: Wyoming State Forest, *Lendemer 2386 & Macklin* (hbL). **TENNESSEE.** CARTER CO.: Roan Mountain State Park, *Harris 30897* (NY). **VERMONT.** LAMOILLE CO.: Babcock Nature Preserve of Johnson State College, *Harris 51367* (NY), *Harris 51368* (NY). **WEST VIRGINIA.** MASON CO.: sine loc., *Showman s.n.* (OSU). POCAHONTAS CO.: Watoga State Park, Brooks Memorial Arboretum, *Harris 43974* (NY).

The species has also been reported from Virginia, USA by Hale (1976) however we have not reviewed the specimen.

