



**DISTRIBUTION OF THE SMOKY WILLOWFLY, *BOLOTOPERLA ROSSI* (FRISON)  
(PLECOPTERA: TAENIOPTERYGIDAE: BRACHYPTERAINAE)  
IN EASTERN NORTH AMERICA**

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**ABSTRACT**

Previous records of *Bolotoperla rossi* (Frison) are reviewed and new records are presented, including the apparent first records from South Carolina and Massachusetts. Additional records are also presented for Maine, New Hampshire, New York, North Carolina, Pennsylvania, Quebec, Tennessee, Virginia and West Virginia.

**Keywords:** Plecoptera, *Bolotoperla rossi*, new records, distribution

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**INTRODUCTION**

Frison (1942) described *Bolotoperla rossi* (as *Brachyptera rossi* Frison) from a single male specimen collected in New Hampshire. Ricker

(1943) in his discussion of taeniopterygid genera and subgenera stated "...rossi Frison will probably require a new subgeneric name". Illies (1966) later transferred the species to *Taenionema* Banks and it

remained in that genus until Ricker & Ross (1975) proposed a new monotypic genus, *Bolotoperla*, for the species. Ricker & Ross (1975) also published the first description of the female based on a Quebec specimen, and provided the initial records of this species from North Carolina and West Virginia. Kondratieff & Voshell (1979) included the species on a checklist of stoneflies known to occur in Virginia, but without specific collecting data. The larva of the species was described by Kirchner & Harper (1983) from material collected at three sites in Virginia and two sites in West Virginia. Subsequently, additional records from Maine (Mingo 1983), North Carolina (Kondratieff et al. 1995), New York (Baumann & Kondratieff 2009; Myers et al. 2011), Pennsylvania (Masteller 1996; Earle 1994; 2009), Quebec (Harper & Harper 1983), Tennessee (DeWalt et al. 2007), Virginia (Kondratieff & Kirchner 1987), and West Virginia (Tarter & Nelson 2010) have been published. Stewart (2000) summarized the known distribution at that time as Maine, North Carolina, New Hampshire, New York, Pennsylvania, Virginia and West Virginia and also provided excellent illustrations of the adults of the species. Additionally, Baumann & Kondratieff (2009) presented scanning electron micrographs of the male genitalia, including the unique epiproct from a specimen collected at the Sacandaga River, New York.

In recent years we and our colleagues have occasionally collected in the Appalachians during the emergence period of *Bolotoperla*, consequently we have accumulated a few noteworthy records of the species. We take this opportunity to provide a more complete record of the distribution of this interesting species, including the documentation of populations in Massachusetts and South Carolina.

## MATERIALS AND METHODS

Samples were primarily collected with beating sheets, and by hand picking from bridge railings, boulders and driftwood along the stream banks; some specimen records were obtained from colleagues. Specimens were preserved in 75-80% ethanol and archived in Audrey B. Harrison Collection (ABHC), Jackson, Mississippi, Bill P. Stark Collection (BPSC), Mississippi College,

Clinton, Mississippi, Monte L. Bean Museum (BYUC), Brigham Young University, Provo, Utah, C.P. Gillette Museum of Arthropod Diversity (CSUC), Colorado State University, Fort Collins, Colorado, Clemson University Arthropod Collection (CUAC), Clemson, South Carolina, Illinois Natural History Survey, Urbana, Illinois (INHS), Collection Ouellet-Robert, Université Montréal (UMC), and Scott A. Grubbs Collection (WKUC), Western Kentucky University, Bowling Green, Kentucky. GPS coordinates for most new records sites were determined in the field with a portable Garmin GPS 72H, or comparable unit. Records without GPS coordinates were georeferenced using ACME Mapper 2.1, and all records were mapped using ArcMap 10.3.1.

## RESULTS

### *Bolotoperla rossi* (Frison)

*Brachyptera rossi* Frison 1942:254. Holotype ♂ (Illinois Natural History Survey), Bog Brook, near Woodstock, [Grafton Co.] New Hampshire

*Taenionema rossi*: Illies, 1966:71

*Bolotoperla rossi*: Ricker & Ross, 1975:136

*Bolotoperla rossi*: Baumann & Kondratieff, 2009:220

**Published records:** **CANADA:** **QC**, Brome Co. (Ricker et al. 1968; Ricker & Ross 1975), Unknown site, plot on Fig. 3 (Harper & Harper 1983). **UNITED STATES:** **ME**, Penobscot Co., Washington Co. (Mingo 1983); **NC**, Burke Co., Swain Co. (Ricker & Ross 1975); Unknown Co. (Kondratieff et al. 1995); **NH**, Grafton Co. (Frison 1942); **NY**, Unknown Co. (Myers et al. 2011), Hamilton Co. (Baumann & Kondratieff 2009); **PA**, Dauphin Co. (Earle 1994, 2009; Masteller 1996), Pike Co. (Earle 2009), Sullivan Co., Union Co. (Masteller 1996); **TN**, Blount Co. (DeWalt et al. 2007); **VA**, Giles Co., Washington Co. (Kirchner & Harper 1983); Grayson Co. (Stark et al. 1998). Unknown Co. (Kondratieff & Voshell 1979; Kondratieff & Kirchner 1987); **WV**, Braxton Co., Pocahontas Co. (Kirchner & Harper 1983), Greenbrier Co., Lewis Co., Nicholas Co. (Tarter & Nelson 2010), Wayne Co. (Ricker & Ross 1975).

**New records:** **CANADA:** **QC:** Riviere-aux-Orignaux, Saint-Camille, 21 May 1988, Y. Dulude,

2♂ (UMC). Riviere du Loup, 10 km N Saint-Alexis-des-Monts, 11 May 1988, specimen number and collector not available, (UMC). Riviere Noire, Rte 170, 15 km NW Saint-Simeon, 10 June 1997, S.A. Grubbs, 2♂, 1♀ (WKUC). Riviere Quaquak, Kiskiss, Rte 155, 3 km S Lac-des-Commissaires, 9 June 1997, S.A. Grubbs, 2♀ (WKUC). **UNITED STATES: MA:** Berkshire Co., Westfield River, Hwy 8A, Savoy, 27 April 1991, R.W. Baumann, M.F. Whiting, 2♂, 1♀ (BYUC). **ME:** Oxford Co., Newton Brook Rest Area, 31 May 1987, R.W. Baumann, G.Z. Jacobi, 2♂ (BYUC). Washington Co., Narragausus River, Rt 9, 2 June 1998, B.C. Kondratieff, R.W. Baumann, 1♀ (CSUC). Narragausus River, island, 5 May 1973, T. Mingo, 1♂, 1♀ (UMC). **NC:** Avery Co., Linville River, Blue Ridge Parkway, 18 May 1994, B.C. Kondratieff, R.F. Kirchner, 1♀ (CSUC). Haywood Co., Cold Springs Creek, Forest Road 148 at I-40, 24 March 1991, B.C. Kondratieff, 3♂, 2♀ (CSUC). Jackson Co., Whitewater River, 12 March 2003, S.K. Kim, 5 larvae (CUAC). Macon Co., Cullasaja River, Goldmine Road, 35° 06.091' N, 83° 15.810' W, 6 March 2016, B. Stark, A.B. Harrison, K. Nye, 1♀ (BPSC), 2♂, 1♀ (ABHC). Same site, 14 March 2011, B. Stark, 2♂, 2♀ (BPSC). Cullasaja River, above Goldmine Road, 35° 05.751' N, 83° 15.795' W, 6 March 2016, B. Stark, A.B. Harrison, K. Nye, 1♂, 3♀ (BPSC), 8♂, 2♀ (ABHC). Cullasaja River, 12 km SE Franklin, Nantahala National Forest, 35.10851 N, 83.26842 W, 12 May 2000, S.A. Grubbs, 1♂ (WKUC). Madison Co., Big Laurel Creek, north of Runion, 24 March 1991, B.C. Kondratieff, 3♂, 8♀ (CSUC). McDowell Co., Buck Creek, Hwy 80 near Sunnyvale, 18 May 1994, B.C. Kondratieff, R.F. Kirchner, 4♂, 1♀ (CSUC). Swain Co., Eagle Creek, 400 m downstream of Campground 89, 35.4985° N, 83.7638° W, 28 May 2003, B.D. Heinhold, 1♀ (INHS). **NH:** Strafford Co. Cocheco River, Watson Road, 5 km W Dover, 23 April 2008, D.S. Chandler, 2♂, 2♀, 2 larvae (BYUC). **NY:** Clinton Co., Saranac River, off Silver Lake Road, 1 May 2005, L. Myers, 3♂, 1 larva (CSUC). **PA:** Union Co., White Deer Creek, 0.5 miles below sheet tram trail, 3 April 1995, S. Moulton, 1♂ (CSUC). **SC:** Oconee Co., Chattooga River, Hwy 28, 4 April 2001, K. Strickland, 1 larva (CUAC). Same

site, 2 April 2003, J. Morse, 1♀ (CUAC). Corbin Creek, 9 March 2001, C. Nickel, 1 larva (CUAC). Pickens Co., Eastatoe Creek, Hwy 143, 15 February 1995, N. Hamada, 3 larvae (CUAC). Same site, 15 February 1995, T. Arslan, 1 larva CUAC). **TN:** Blount Co., West Prong Little River, abv Tremont Ranger Station, Smoky Mountains National Park, 35.63892 N, 83.68991 W, 11 April 1977, A.R. Brigham, G.A. Schuster, J.D. Unzicker, 1♂, 1 larva (INHS). Greene Co., Paint Creek, Viking Mountain Road nr jct FR 358, 22 March 1991, B.C. Kondratieff, 6♂, 2♀ (CSUC). Johnson Co., Beaverdam Creek, Hwy 133, Backbone Rock Campground, Cherokee National Forest, 6 March 1991, R.W. Baumann, S.M. Clark, 5♂, 5♀ (BYUC). Monroe Co., Tellico River, below Wildcat Overlook, Hwy 165, 35° 21.110' N, 84° 15.911' W, 7 March 2016, B. Stark, A.B. Harrison, K. Nye, 1♂ (BPSC), 1♀ (ABHC). Tellico River, Wildcat Overlook, 35° 20.926' N, 84° 14.900' W, 7 March 2016, B. Stark, A.B. Harrison, K. Nye, 1♀ (ABHC). Tellico River, Bald River Falls, 35° 19.471' N, 84° 10.613' W, 7 March 2016, B. Stark, A.B. Harrison, K. Nye, 1♀ (BPSC). Sevier Co., Great Smoky Mountains National Park, Elkmont, 1 May 1982, B. Adams, M. Britton, 1♀ (BPSC). Little River, below Elkmont Campground, 10 May 2001, Terry & Terry, 1♀ (BYUC). Sullivan Co., Beaverdam Creek, 30 May 1998, K. Snelling, 1♀ (CSUC). **VA:** Giles Co., Stony Creek, Rt 635, 1 mile NE Olean, 10 April 1981, B.C. Kondratieff, 5♂, 7♀ (CPGM). Smyth Co., Hurricane Creek, FR 84 at campground, 27 February 1980, B.C. Kondratieff, R.F. Kirchner, 2♂ (CSUC). North Fork Holston River, NFHRM 79.5, 15 March 1988, B.J. Armitage, 1♂ (INHS). Tazewell Co., spring, East Fork Cove Creek, 1 mi N Cove Creek, 16 May, 1994, R.W. Baumann, B.C. Kondratieff, 1♀ (BYUC). Washington Co., Straight Branch Big Laurel Creek, 5 mi E Damascus, Hwy 58, Jefferson National Forest, 19 March 1976, R.F. Kirchner, 5♂, 2♀ (CSUC), 3♂, 3♀ (UMC). Same site, 20 March 1976, R.F. Kirchner, 9♂, 11♀ (UMC). Same site, 26 March 1977, R.F. Kirchner, G.T. Voreh, 12 larvae (CSUC). **WV:** Greenbrier Co., North Fork Cherry River at Coats Run, Hwy 39/55, 22 May 1999, B. Stark, R.F. Kirchner, 1♂ (BPSC).

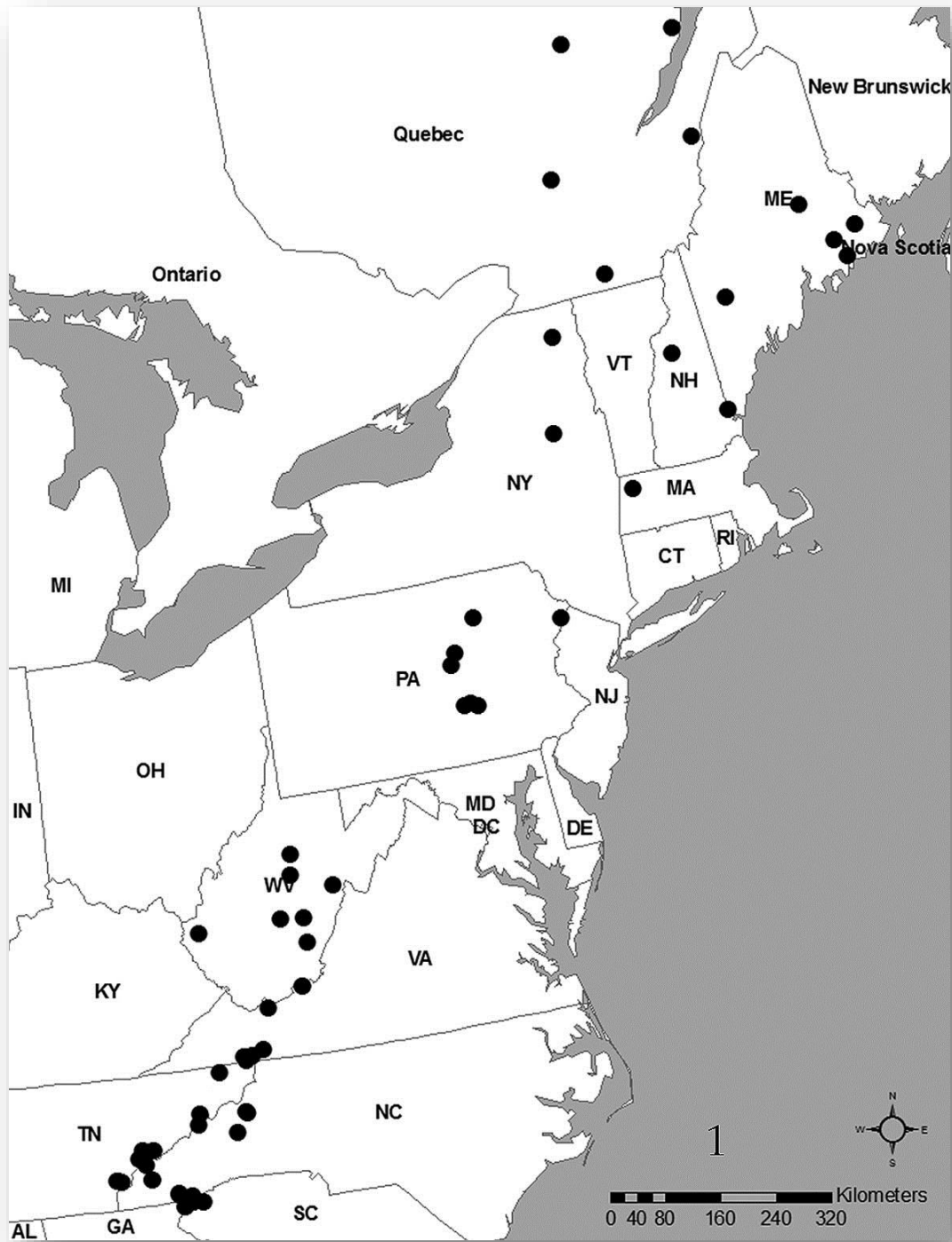


Fig. 1. Distribution of *Bolotoperla rossi* in North America. Each dot represents a single collection site.

## DISCUSSION

*Bolotoperla rossi* was previously known from sites as far north as Quebec (Ricker & Ross 1975; Harper & Harper 1983) and Maine (Mingo 1983) and as far south as North Carolina (Ricker & Ross 1975). Records from South Carolina have not been specifically included on checklists of southern Appalachian stoneflies (e.g. McCaskill & Prins 1968), consequently the South Carolina records provided by Clemson University represent a small range extension for the species, and the small series of specimens collected at Westfield River, Berkshire Co. represent the first specimens from Massachusetts. The known distribution of *B. rossi* is shown in Fig. 1. Based on proximity to known sites, additional state records might be sought in northern Georgia, western Maryland, northern New Jersey, Connecticut and Vermont.

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## REFERENCES

Baumann, R.W. & B.C. Kondratieff. 2009. Studies on the Holarctic subfamily Brachypterinae (Plecoptera: Taeniopterygidae) using the scanning electron microscope to study male terminalia. *Aquatic Insects* (Supplement 1), 31:219-230.

DeWalt, R.E., L.M. Jacobus, & W.P. McCafferty. 2007. Summer Ephemeroptera, Plecoptera, and Trichoptera from southwestern drainages in Great Smoky Mountains National Park, with additional Ephemeroptera records. *Proceedings of the Entomological Society of Washington*,

109:136-154.

Earle, J. 1994. New records of stoneflies (Plecoptera) from Pennsylvania. *Entomological News*, 105:80-84.

Earle, J. 2009. New state stonefly (Plecoptera) records for Pennsylvania, with additional records and information on rare species. *Illiesia*, 5:169-181.

Frison, T.H. 1942. Studies of North American Plecoptera with special reference to the fauna of Illinois. *Bulletin of the Illinois Natural History Survey*, 22:235-355.

Harper, P. & F. Harper. 1983. Biogeographie et associations des Plécoptères d'hiver du Quebec meridional (Plecoptera: Capniidae et Taeniopterygidae). *Canadian Entomologist*, 115:1465-1476.

Illies, J. 1966. *Katalog der rezenten Plecoptera*. Das Tierrech. Walter de Gruyter, Berlin, Germany. 82:1-XXX, 1-692 pp.

Kirchner, R.F. & P.P. Harper. 1983. The nymph of *Bolotoperla rossi* (Frison) (Plecoptera: Taeniopterygidae: Brachypterinae). *Journal of the Kansas Entomological Society*, 56:411-414.

Kondratieff, B.C. & R.F. Kirchner. 1987. Additions, taxonomic corrections, and faunal affinities of the stoneflies (Plecoptera) of Virginia, USA. *Proceedings of the Entomological Society of Washington*, 89:24-30.

Kondratieff, B.C. & J.R. Voshell, Jr. 1979. A checklist of the stoneflies (Plecoptera) of Virginia. *Entomological News*, 90:241-246.

Kondratieff, B.C., R.F. Kirchner, & D.R. Lenat. 1995. A review of stonefly records (Plecoptera: Hexapoda) of North Carolina and South Carolina. *Brimleyana*, 23:25-40.

Masteller, E.C. 1996. New records of stoneflies (Plecoptera) with an annotated checklist of the species for Pennsylvania. *The Great Lakes Entomologist*, 29:107-120.

McCaskill, V.H. & R. Prins. 1968. Stoneflies (Plecoptera) of northwestern South Carolina. *Journal of the Elisha Mitchell Scientific Society*, 84:448-453.

Mingo, T.M. 1983. An annotated checklist of the stoneflies (Plecoptera) of Maine. *Entomological News*, 94:65-72.

Stark, B.P., A.B. Harrison, B.C. Kondratieff, R.W. Baumann, and K.C. Nye. 2016. Distribution of the Smoky Willowfly, *Bolotoperla rossi* (Frison) (Plecoptera: Taeniopterygidae: Brachypterainae) in Eastern North America. *Illiesia*, 12(03):15-20. Available online: <http://illiesia.speciesfile.org/papers/Illiesia12-03.pdf>

- Myers, L.W., B.C. Kondratieff, T.B. Mihuc, & D.E. Ruitter. 2011. The mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) of the Adirondack Park (New York State). *Transactions of the American Entomological Society*, 137:63-140.
- Ricker, W.E. 1943. Stoneflies of Southwestern British Columbia. Indiana University Publications, Science Series No. 12. Indiana University Press, Bloomington, Indiana. 145 pp.
- Ricker, W.E. & H.H. Ross. 1975. Synopsis of the Brachypterinae (Insecta: Plecoptera: Taeniopterygidae). *Canadian Journal of Zoology*, 53:132-153.
- Ricker, W.E., R. Malouin, P. Harper, & H.H. Ross. 1968. Distribution of Québec stoneflies (Plecoptera). *Le Naturaliste Canadien*, 95:1085-1123.
- Stark, B.P., S.W. Szczytko, & C.R. Nelson. 1998. American Stoneflies: A Photographic Guide to the Plecoptera. The Caddis Press, Columbus Ohio. 126 pp.
- Stewart, K.W. 2000. Taeniopterygidae (The Willowflies). Pp 55-98 in Stark, B.P. & B.J. Armitage (eds.). Stoneflies (Plecoptera) of Eastern North America. Volume 1. Pteronarcyidae, Peltoperlidae, and Taeniopterygidae. Ohio Biological Survey Bulletin New Series, Volume 14. Columbus, Ohio. vii + 100 pp.
- Tarter, D.C. & C.H. Nelson. 2010. New state, county, and drainage basin records of West Virginia (USA) stoneflies (Plecoptera). *Entomological News*, 121:159-162.

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