

**NEW STATE RECORD OF THE MAYFLY
BAETISCA LAURENTINA McDUNNOUGH FOR WEST
VIRGINIA (EPHEMEROPTERA: BAETISCIDAE) AND
NEW COUNTY RECORDS FOR SPECIES OF *BAETISCA*
IN KENTUCKY AND WEST VIRGINIA, U.S.A.¹**

Donald C. Tarter,² Dwight L. Chaffee,³ Jeffery E. Bailey,⁴ and Sandy Raimondo⁵

ABSTRACT: *Baetisca laurentina* McDunnough is reported for the first time from West Virginia. One male imago was collected near Twelvepole Creek, Wayne County, West Virginia. This record extends the range of this species eastward to the Mid-Atlantic coastal region. New distributional records (57) of *Baetisca* spp. are reported for Kentucky (15) and West Virginia (42). The following county records have been added to the list of *Baetisca* spp. from the two states: *Baetisca berneri* Tarter and Kirchner (KY/1 and WV/13), *B. carolina* Traver (WV/3), *B. gibbera* (WV/1), *B. lacustris* McDunnough KY/14 and WV/22), *B. laurentina* McDunnough (WV/1), and *B. rubescens* Provancher (WV/2). *Baetisca lacustris* is the most widespread baetiscid in West Virginia (26 counties) and Kentucky (25 counties). This species was found in six drainage basins (I, II, IV, V, VI, VII) in West Virginia. Only one baetiscid mayfly, *B. rubescens*, was recorded for drainage basin III.

KEY WORDS: Ephemeroptera, *Baetisca*, state and county records, Kentucky, West Virginia

The North American endemic family *Baetiscidae* is monotypic, containing only the genus *Baetisca* (Pescador and Berner, 1981). Presently, twelve species are recorded for eastern North American, Great Plains, and the Northwest Territories of Canada (Pescador and Berner, 1981). Nymphs of *Baetisca* live partially buried in silt, sand, gravel of small to moderate sized streams. Distributional and/or ecological information on the *Baetisca* spp. in West Virginia and Kentucky have been reported by the following investigators: Traver (1931, 1935), Needham et al. (1935), Olson (1971), Berner (1977), Faulkner and Tarter (1977), Tarter and Kirchner (1978), Chaffee and Tarter (1979), Morris et al. (1980), Pescador and Berner (1981), Pettry and Tarter (1983, 1985), Tarter and Pettry (1983), Burgess and Tarter (1989), and Randolph and McCafferty (1998).

Baetisca specimens used in this investigation were deposited at the following agencies/institutions: Biological Systems Consultants (Lexington, Kentucky), Colorado State University, Marshall University (West Virginia Benthological Survey), Morehead State University, United States Army Corps of Engineers (Huntington District), West Virginia Department of Environmental Protection (Watershed Assessment Section), and West Virginia University.

¹ Received April 26, 2006. Accepted April 25, 2007.

² Department of Biological Sciences, Marshall University, Huntington, West Virginia 25755 U.S.A. E-mail: tarter@marshall.edu

³ Forest Biology Consultant, P. O. Box 814, Richmond, Kentucky 40476 U.S.A.

⁴ West Virginia Department Environmental Protection, 601 57th Street, S.E. Charleston, West Virginia 25304 U.S.A. E-mail: jbailey@wvdepo.org

⁵ USEPA Gulf Ecology Division, Gulf Breeze, Florida 32561 U.S.A. E-mail: sandyrainondo@yahoo.com

DISTRIBUTIONAL RECORDS

West Virginia

Janssen (1973) divided the state into the following drainage basins (Fig. 1): I. Ohio River (industrialization and farming), II. Monongahela River (high elevations and some acid mine pollution), III. Potomac River (farming, little pollution), IV. Little Kanawha River (slow, low gradient streams), V. Kanawha River (industrialization), VI. Guyandot River (heavy acid mine pollution) and VII. Big Sandy River (mining, low gradient streams). All baetiscid records are listed by drainage basin and county.

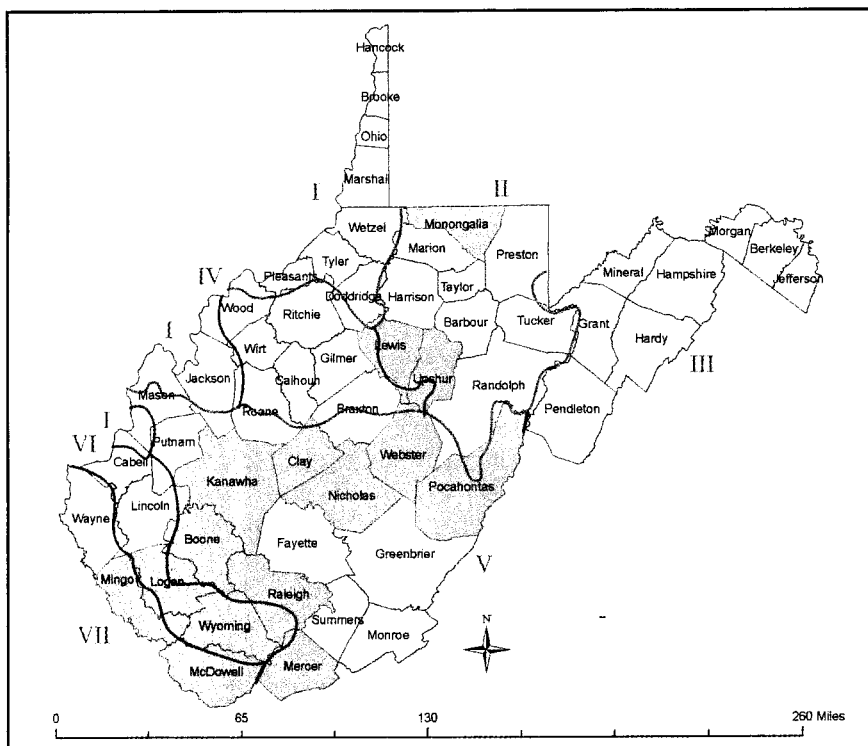


Figure 1. Janssen's (1973) drainage basins in West Virginia.

***Baetisca berneri* Tarter and Kirchner 1978**

Tarter and Kirchner (1978) described mature nymphs from Laurel Fork of Pigeon Creek in Mingo County (drainage basin VII). Pescador and Berner (1981) reported this species from the Morgantown area in Monongalia County (drainage basin II). The following counties (13) are added to the distribution of this species (Fig. 2): Drainage basins II, V, VI, VII (Boone Co.: Bennett Fk., 23-14-97/Left Fk. of Joes Cr., 07-X-97 and Spicelick Fk., 17-IX-97; Clay Co.: Sycamore Cr., 11-IX-02; Kanawha Co.: Bells Cr., 16-VII-03/Slaughter Cr., 26-IX-01/Bradley

Fk., 26-IX-01/Dry Br., 03-X-01 and Blue Cr., 05-IX-02; Lewis Co.: Little Kanawha River, 25-IX-80; Logan Co.: Cow Cr., 09-V-78 and Pine Cr., 14-III-79; McDowell Co.: War Cr., 16-IX-03; Mercer Co.: Camp Cr., 10-VIII-99; Nicholas Co.: Panther Cr., 25-VII-75; Camp Cr., 15-X-05; Pocahontas Co.: Little River, 29-VII-99; Raleigh Co.: Peachtree Cr., 25-IX-97 and Rock Cr., 07-X-97; Usphur Co.: Right Fk. of Buckhannon River, 06-X-02 and Left Fk. of Buckhannon River, 08-X-02; Webster Co.: Elk River, 07-XI-89; Wyoming Co.: Measle Fk., 05-IX-00).

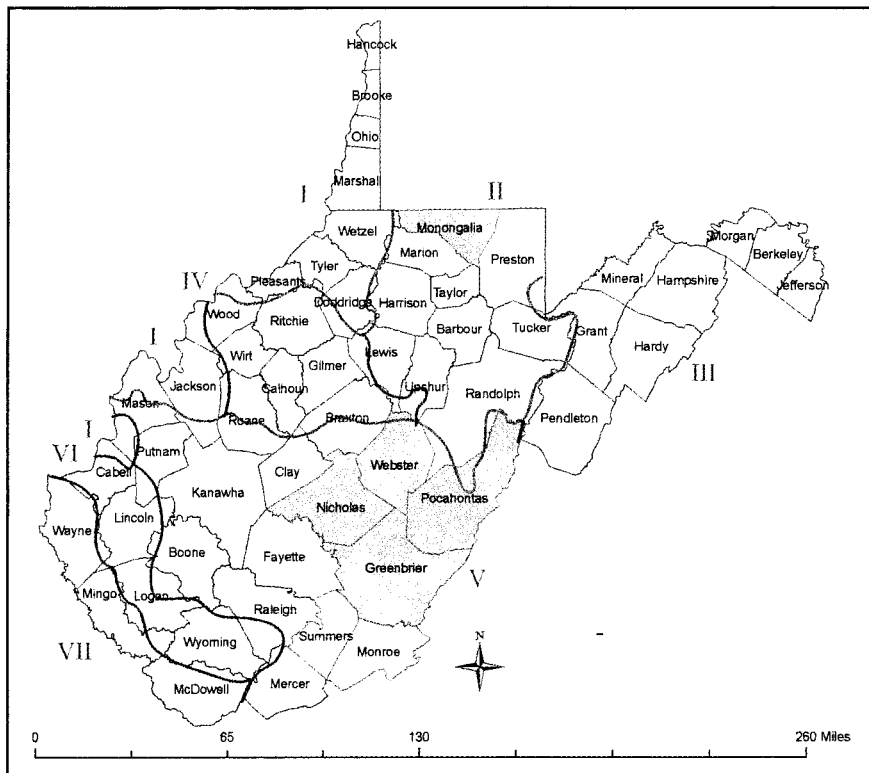


Fig. 2. County distribution records of *Baetisca berneri* in West Virginia.

Baetisca callosa Traver 1931

Traver (1931) described *B. callosa* from a tributary of the Potomac River in West Virginia. However, Pescador and Berner (1981) studied the paratype nymphs from Preston and Mineral counties from West Virginia and concluded that the enigmatic species is not recognizable. From the examination of immature nymphs of the species of *Baetisca*, they reported that *B. callosa* Traver represents a very young stage of some species already described – perhaps *B. carolina* Traver or *B. berneri* Tarter and Kirchner. One author (Tarter) has collected

and identified young and mature nymphs of *Baetisca* spp. for 30 years in West Virginia and has identified *B. callosa* from 10 counties. He disagrees with suggestions that *B. callosa* is a young stage of *B. carolina* Traver or *B. berneri* Tarter and Kirchner. Efforts are being made to collect and rear specimens from the type locality and other counties in drainage basin III to resolve the taxonomic problem associated with this enigmatic species.

Baetisca carolina Traver 1931

Petry and Tarter (1985) reported the ecological life history of this species from Panther Creek, Nicholas County, West Virginia (drainage basin V). Needham et al. (1935) recorded this species from Monongalia County in West Virginia (drainage basin II). The following counties (3) are added to the distribution of this species (Fig. 2): Drainage Basin V (Greenbrier Co.: North Fk. of Cherry River, 25-VII-75; Pocahontas Co.: Tea Cr. of Williams River, 02-VIII-73; Webster Co.: Cranberry River, 05-VIII-77).

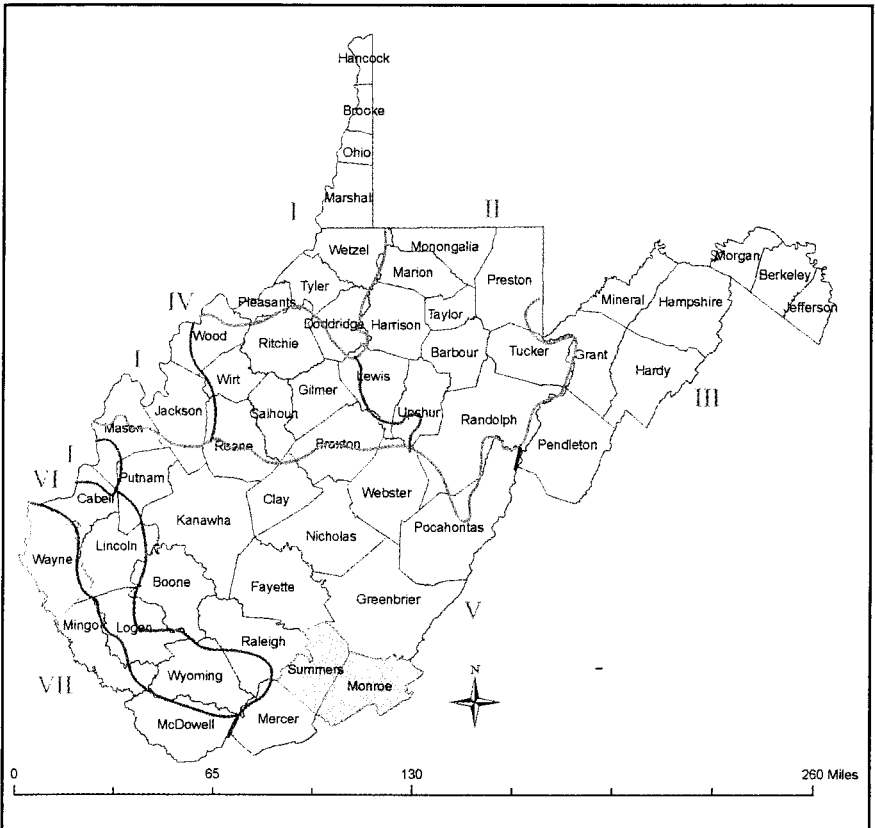


Fig. 3. County distribution records of *Baetisca carolina* in West Virginia.

Baetisca gibbera Berner 1955

Nymphs of *B. gibbera* have been recorded from the cool mountain streams of the Appalachian Mountains and the warm waters of the Coastal Plain (Pescador and Berner, 1981). Burgess and Tarter (1989) recorded this from Indian Creek in Monroe County, West Virginia (drainage basin V). The following county is added to the distribution of this species (Fig. 4): Drainage basin V (Summers Co.: Indian Cr., 28-III-83).

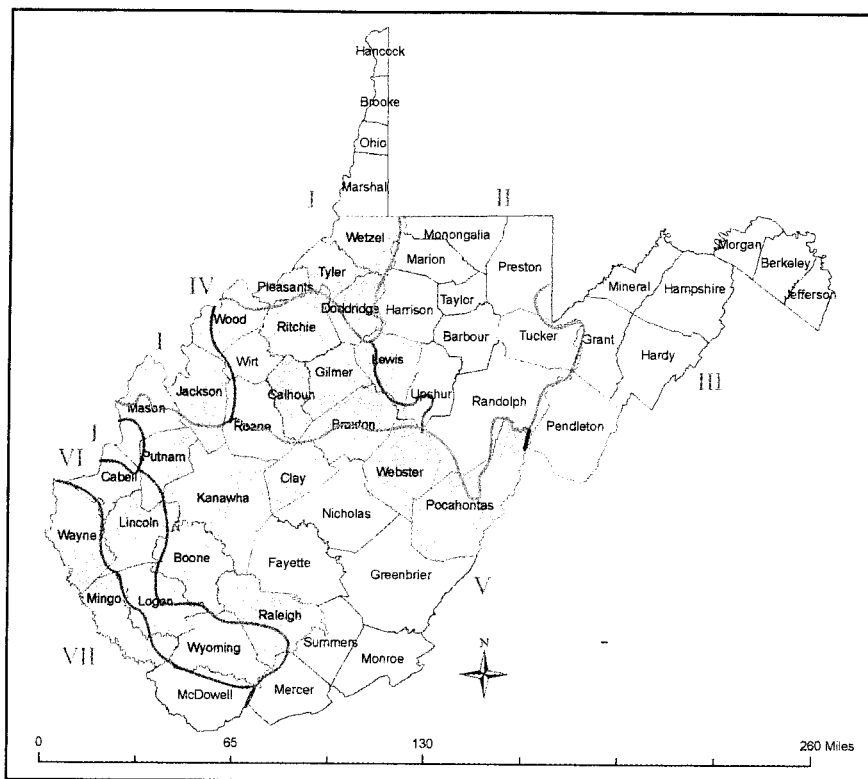


Fig. 4. County distribution records of *Baetisca gibbera* in West Virginia.

Baetisca lacustris McDunnough 1932

Baetisca lacustris (= *B. bajkovi* Neave) has been collected from the Great Lakes region and across the United States and Canada to the eastern slope of the Rocky Mountains (Burks, 1953; Pescador and Berner, 1981). This species has been reported from following counties in West Virginia (drainage basins I, II, VI, VII): Lewis, Lincoln, Pleasants, Wayne (Olson, 1971; Faulkner and Tarter, 1977). Chaffee and Tarter (1979) reported the life history and ecology of this species from Beech Fork in Wayne County. The following counties (22) are

added to the distribution of this species (Fig. 5): Drainage basins I, IV, V, VI, VII (Boone Co.: Big Horse Cr., 25-XI-75/Spruce Laurel Fk., 25-IX-97 and Laurel Cr., 07-X-97; Braxton Co.: Coon Cr., no date/Falls Run, 25-IX-80 and Knawl Cr., 17-XI-77; Cabell Co.: Mill Cr., of Mud River, 12-IX-71 and Charley Cr., 16-IX-03; Calhoun Co.: no locality data; Clay Co.: Elk River, 22-VI-73; Doddridge Co.: Toms Fk., 16-IX-03 and Meathouse Fk., 16-IX-03; Gilmer Co.: Steer Run, 25-IV-74; Jackson Co.: Right Fk. of Sandy Cr., 15-IV-99; Kanawha Co.: Kanawha River, 13-IV-82 and Davis Cr., 06-V-02; Logan Co.: Hoover Fk. 04-V-98 and Seng Camp Cr., 07-VIII-02; Mason Co.: Jerry's Run, 17-IV-74; Mingo Co.: East Fk. of Twelpepole Cr., 28-IV-03/Tug Fk. River, 24-IX-03/Guyandotte River, 21-IV-82 and West Fr. of Twelpepole Cr., 03-V-00; Pocahontas Co.: Douthat Cr., 19-V-72/Mullenax Run, 20-VII-99/Little River of West Fk. of Greenbrier River, 29-VII-99 and East Fk. of Greenbrier River, 20-VII-00; Putnam Co.: Coon Cr., 19-III-73 and Clymer Cr., 24-II-73; Raleigh Co.: Marsh Fr. of Big Coal River, 13-XI-86; Ritchie Co.: South Fk. of Hughes River, no date and Indian Cr., 13-V-99; Roane Co.: Green Cr., 28-V-97 and Big Sandy Cr., 10-IX-02; Tyler Co.: Middle Island Cr., 15-X-99 and Indian Cr., 09-IX-03; Webster Co.: Left Fk. of Holly River, 09-VII-78; Wetzel Co.: South Fk. of Fishing Cr., 26-IV-99; Wood Co.: Worthington Cr., no date and Walker Cr., no date; Wyoming Co.: Guyandotte River, 21-IV-82 and Measle Fk., 05-IX-00.

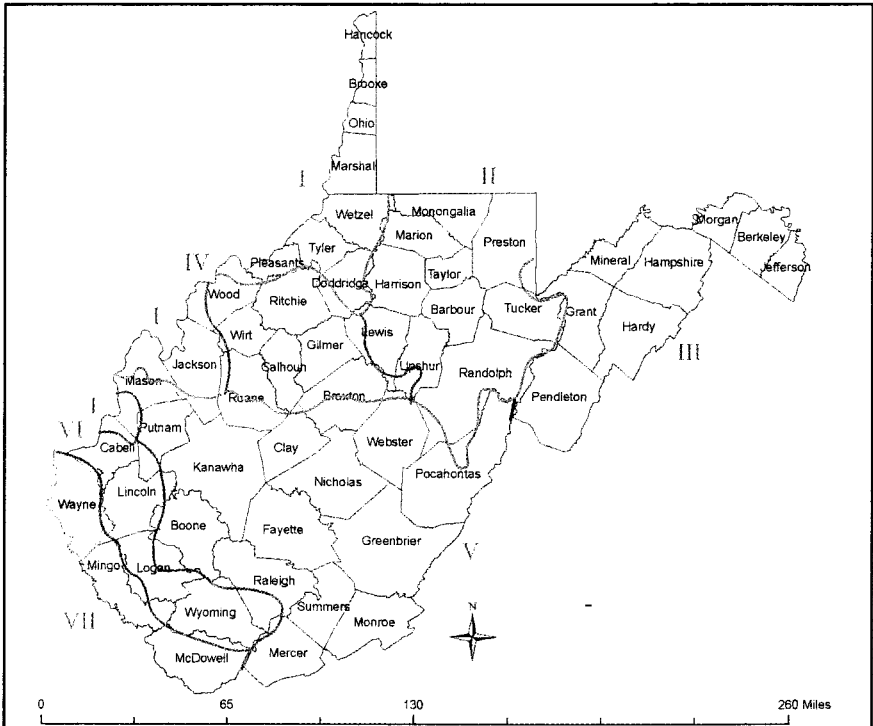


Fig. 5. County distribution records of *Baetisca lacustris* in West Virginia.

Baetisca laurentina McDunnough 1932

Baetisca laurentina is widely distributed in many areas of eastern North America, the Great Plains, through Canada into the Northwest Territories (Pescador and Berner, 1981; Randolph and McCafferty, 1998). On 13 May 1990, one male imago of *B. laurentina* was collected near Twelvepole Creek (Rt. 75, Shoals) in Wayne County, West Virginia (drainage basin VII (by Kondratieff, Welch, and Kirchner) (Fig. 6). This record extends the range of this species eastward to the mid-Atlantic coastal region. Randolph and McCafferty recorded this species from nearby Ohio (Adams, Highland, and Lawrence counties).

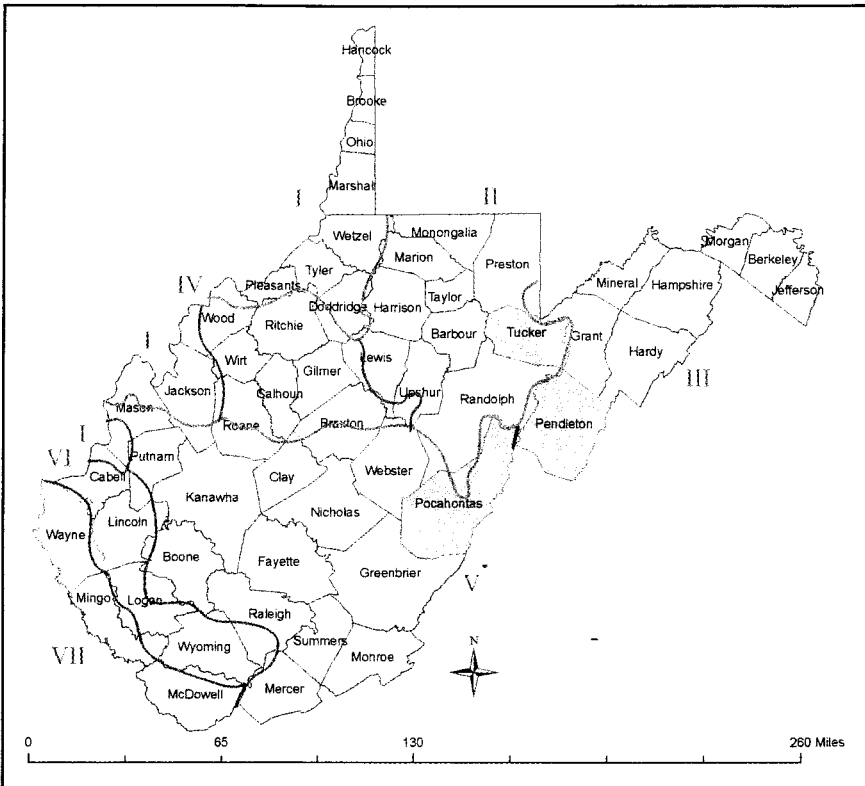


Fig. 6. County distribution records of *Baetisca laurentina* in West Virginia.

Baetisca rubescens Provancher 1876

Tarter and Pettry (1983) reported this species from Red Creek, Tucker County, West Virginia (drainage basin II). The following counties (2) are added to the distribution of this species (Fig. 7): Drainage basin III, V Pendleton Co.: Seneca Cr., 07-X-00; Pocahontas Co.: East Fk. of Greenbrier River, 26-IV-87.

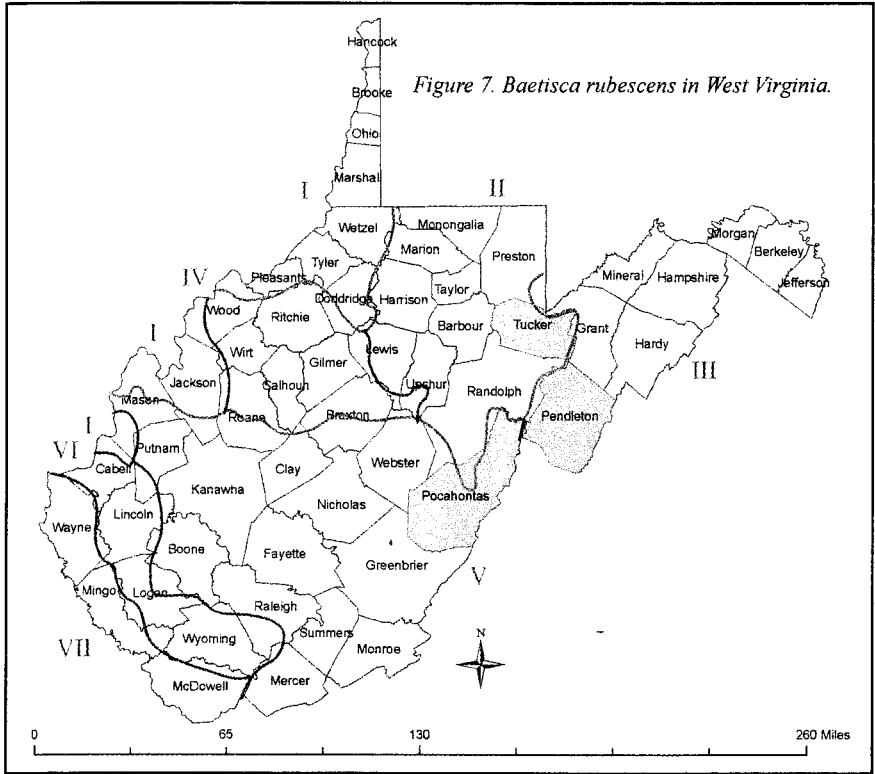


Fig. 7. County distribution records of *Baetisca rubescens* in West Virginia.

Kentucky

Two species of baetiscids, *B. berneri* and *B. lacustris*, have been reported from Kentucky (Pescador and Berner, 1981; Randolph and McCafferty, 1998). Based on collections from Ohio (Randolph and McCafferty, 1998) and western West Virginia, *B. laurentina* may also be found in Kentucky. Randolph and McCafferty (1998) reported *B. obesa* from southwestern Ohio, suggesting that it also may occur in Kentucky.

Baetisca berneri Tarter and Kirchner 1978

Prior to this investigation, *B. berneri* had been reported only from one drainage in Kentucky (Letcher County) (Randolph and McCafferty, 1998). On 19 October 1999, nymphs were collected from Brownies Creek in Harlan County.

Baetisca lacustris McDunnough 1932

Prior to this study, *B. lacustris* had been reported from 11 counties (Breathitt, Elliott, Floyd, Jackson, Knott, Lawrence, Lewis, Morgan, Pike, Pulaski, Wolfe)

in Kentucky (Pescador and Berner, 1981; Randolph and McCafferty, 1998). The following records (14) are added to the distribution of this species (http://www/nws/noaa.gov/mirs/public/prods/maps/cnty_fips_kentucky.htm): Boyd Co.: East Fork of Little Sandy River, 14-XI-78; Carter Co.: no locality data; Clay Co.: Goose Cr., 17-X-78 and Redbird River, 03-III-00; Estill Co.: Station Camp Cr., 18-IV-02, Johnson Co.: Little Paint Cr., 09-X-85/Paint Fk., 26-IX-77 and Open Fk. of Paint Creek, 21-XI-75; Lee Co.: Ross Cr., 04-X-00; Letcher Co.: Colliers Cr., no date; Magoffin Co.: Lick Cr., 12-X-00; Martin Co., Horse-Pin Cr., 18-V-04; Menifee Co.: Gladie Cr., 23-X-00; Owsley Co., Wild Dog Cr., 04-X-00; Powell Co.: Fishtrap Br., 05-III-01; Rowan Co.: Elk Lick Fk., 16-II-06; Whitley Co.: Mud Cr., 12-X-04.

ACKNOWLEDGMENTS

The authors are grateful to the following persons for the loan of *Baetisca* specimens and help in field work: Mr. Kerry Bledsoe (Marshall University), Dr. Linda Butler (West Virginia University), Jack Humphreys (Marshall University), Mr. Fred Kirchner (US Army Corps of Engineers, Huntington District), Mr. Ed Kirk (Research Environmental & Industrial Consultants, Inc), Dr. Boris Kondratieff (Colorado State University), Dr. Sean O'Keefe (Morehead State University) and Mr. James Robinson (Biological Systems Consultants). Special thanks to Drs. Boris Kondratieff (Colorado State University) and Mike Little (Marshall University) for suggestions on the prepublication review of the manuscript.

LITERATURE CITED

- Berner L.** 1955. The southeastern species of *Baetisca* (Ephemeroptera: Baetiscidae). Quarterly Journal Florida Academy Science 18:1-19.
- Berner, L.** 1977. Distributional patterns of southeastern mayflies (Ephemeroptera). Bulletin Florida State Museum, Biological Series 22:1-56.
- Berner, L. and M. L. Pescador.** 1980. The mayfly family Baetiscidae (Ephemeroptera). Part I. Pp. 511-524. In, J. F. Flannagan and K. E. Marshall (Editors). Advances in Ephemeroptera Biology. Plenum Press. New York, NY, U.S.A. 552 pp.
- Burgess, L. and D. Tarter.** 1989. New record of the mayfly *Baetisca gibbera* Berner for West Virginia. Proceeding West Virginia Academy of Science 61:100-102.
- Burks, B. D.** 1953. The mayflies, or Ephemeroptera, of Illinois. Illinois Natural Survey Bulletin 26:1-216.
- Chaffee, D. L. and D. C. Tarter.** 1979. Life history and ecology of *Baetisca bajkovi* Neave in Beech Fork of Twelvepole Creek, Wayne County, West Virginia. (Ephemeroptera: Baetiscidae). Psyche 86:53-61.
- Faulkner, G. M. and D. C. Tarter.** 1977. Mayflies, or Ephemeroptera, of West Virginia with emphasis on the nymphal stage. Entomological News 88:202-206.
- Janssen, R. E.** 1973. Earth Science: a handbook on the geology of West Virginia. Educational Marketeers, Inc. Clarksburg, West Virginia, U.S.A. 345 pp.
- Morris, W. R., D. L. Chaffee, and D. C. Tarter.** 1980. Ecological life history of *Baetisca berneri* Tarter and Kirchner from a West Virginia stream (Ephemeroptera: Baetiscidae). Psyche 87:39-47.

- Needham, J. G., J. R. Traver, and Y. Hsu.** 1935. The biology of mayflies. Comstock Publishing Company, Inc. Ithaca, New York, U.S.A. 759 pp.
- Olson, D. E.** 1971. A pre-impoundment investigation of the aquatic biology, and surveys of the woody vegetation and early socioeconomic impact of a reservoir project on the Beech Fork Basin, Twelvepole Creek, Wayne and Cabell Counties. Unpublished M. S. thesis. Marshall University. Huntington, West Virginia, U.S.A. 87 pp.
- Pescador, M. L. and L. Berner.** 1981. The mayfly family Baetiscidae (Ephemeroptera). Part II. Biosystematics of the genus *Baetisca*. Transactions American Entomological Society 197:163-228.
- Petry, D. K. and D. C. Tarter.** 1983. The relationship between body size and body coloration of *Baetisca carolina* Traver nymphs in Panther Creek, Nicholas County, West Virginia (Ephemeroptera: Baetiscidae). Proceedings West Virginia Academy Science 55:65-71.
- Petry, D. K. and D. C. Tarter.** 1985. Ecological life history of *Baetisca carolina* Traver in Panther Creek, Nicholas County, West Virginia (Ephemeroptera: Baetiscidae). Psyche 92:355-368.
- Randolph, R. P. and W. P. McCafferty.** 1998. Diversity and distribution of the mayflies (Ephemeroptera) of Illinois, Indiana, Kentucky, Michigan, Ohio, and Wisconsin. Ohio Biological Survey Bulletin, New Series 13:1-188.
- Tarter, D. C. and R. F. Kirchner.** 1978. A new species of *Baetisca* from West Virginia (Ephemeroptera: Baetiscidae). Entomological News 89:209-213.
- Tarter, D. C. and D. K. Petry.** 1983. New record of mayfly *Baetisca rubescens* (Provancher) for West Virginia (Ephemeroptera: Baetiscidae). Entomological News 94:141-142.
- Traver, J. R.** 1931. The ephemerid genus *Baetisca*. Journal New York Entomological Society 39:45-66.
- Traver, J. R.** 1935. Part II, Systematic. pp. 239-739 *In*, The biology of mayflies with a systematic account of North American species. J. G. Needham, J. R. Traver, and Y. C. Hsu (Editors). Comstock Publishing Company. Ithaca, New York, U.S.A. 759 pp.