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## **KATHROPERLA SISKIYOU, A NEW STONEFLY SPECIES FROM CALIFORNIA AND OREGON, U.S.A. (PLECOPTERA: CHLOROPERLIDAE)**

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### **ABSTRACT**

A new stonefly species, *Kathroperla siskiyou*, is proposed from specimens collected in southern Oregon and northern California. Adults and eggs of the new species are compared with those of two sympatric congeners, *K. perditata* Banks 1920 and *K. tahoma* Stark & Surdick 1987.

**Keywords:** *Kathroperla*, Plecoptera, Chloroperlidae, egg morphology, new species

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### **INTRODUCTION**

Egg morphology has proven to be a source of useful characters for recognition of species in many stonefly genera (Sivec & Stark 2002, 2008; Stark & Baumann 1978; Stark & Sivec 2008; Stark & Szczytko 1976; Szczytko & Stewart 1979). The tuberculate, sometimes striate, and even four sided chorion of *Kathroperla* Banks, 1920 eggs are perhaps the most distinctive among Chloroperlidae, and these characters have led directly to recognition of two recently named species in the genus (Stark & Surdick 1987; Stark 2010). Stark & Surdick (1987) provided scanning electron micrographs showing that eggs of *K. perditata* Banks, 1920 have a distinctive collar and

irregular striae composed of thick, linear tuberculae, with a few small tuberculae on the interstitial surface, whereas the eggs of *K. tahoma* Stark & Surdick, 1987 have no collar and the entire surface is covered with small, spherical tuberculae, poorly organized into striae. Recently, the authors collected a series of *Kathroperla* females from the north slope of the Siskiyou Mountains of southern Oregon. Because eggs from this population appear different from those of the two recognized species, we were led to examine eggs of other available populations of Nearctic *Kathroperla*, and to propose a new species based on the southern Oregon and some northern California populations.

## MATERIALS AND METHODS

Egg samples were dissected from specimens archived in 75-80% ethanol, but one egg mass was field collected and preserved directly in 80% ethanol. Eggs were placed in an ultrasonic cleaner for 12-15 seconds for cleaning, and then transferred to acetone. Specimens in acetone were individually selected using fine-tipped forceps, attached to aluminum stubs using double stick copper tape, sputter coated with gold-palladium and examined with an Amray 1810D scanning electron microscope at Mississippi College. Terminal segments of some adult male specimens were removed and placed in an ultrasonic cleaner for 15-20 seconds. Cleaned specimens were transferred through 90%, 95% and 100% solutions of ethanol for 10 minutes each, then placed in hexamethyldisilazane for 30 minutes before attaching them to aluminum stubs covered with double stick copper tape and sputter coating each of them before examination with scanning electron microscopy. After eggs were removed from female specimens, terminalia were dissected, placed in 10% KOH and brought to a boil for a few seconds. Specimens were placed in distilled water, extraneous tissue removed, and selected structures were drawn using Wild M5A and Olympus SZH10 dissecting microscopes equipped with drawing tubes. The abdomen of one male specimen of the new species was squeezed in the field to evert the internal genitalic structures prior to preservation and dissection. Specimens from the following collections were examined as indicated in the text.

C.P. Gillette Museum of Arthropod Diversity,  
Colorado State University, Fort Collins, CO  
(CSUC)

Monte L. Bean Life Science Museum, Brigham  
Young University, Provo, UT (BYUC)

Richard Bortorff Collection, South Lake Tahoe,  
CA (RLBC)

John B. Sandberg Collection, Paradise, CA  
(JBSC)

Bill P. Stark Collection, Mississippi College,  
Clinton, MS (BPSC)

United States National Museum of Natural  
History, Washington, DC (USNM)

## RESULTS AND DISCUSSION

### *Kathroperla perdit* Banks

Longhead Sallfly

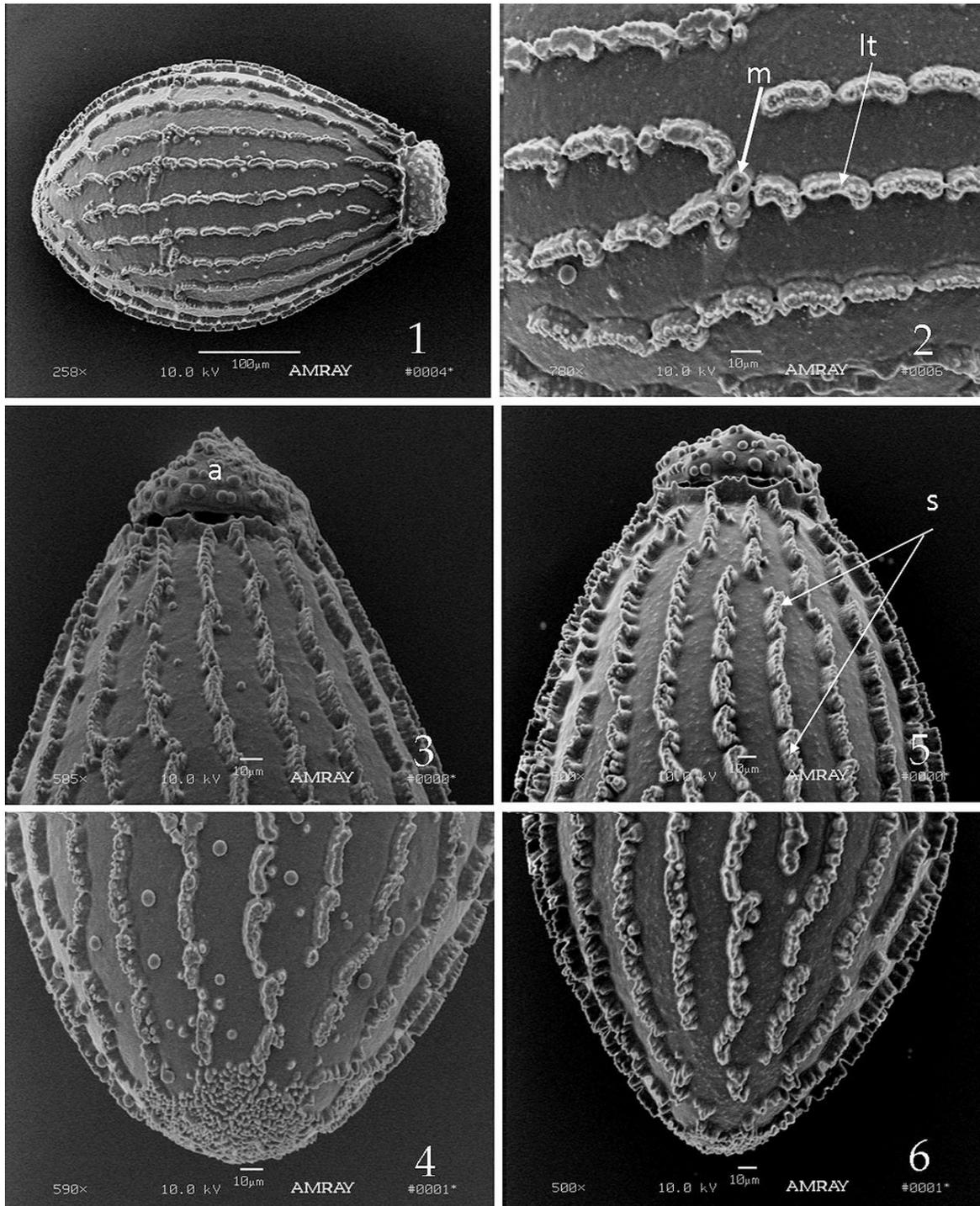
(Figs. 1-8)

*Kathroperla perdit* Banks 1920:315. Holotype ♀  
(Museum of Comparative Zoology), Kaslo, British  
Columbia

*Kathroperla perdit*: Needham & Claassen, 1925:132.  
Description of ♂

*Kathroperla perdit*: Stark & Surdick, 1987:530. SEM  
image of egg

**Material examined. CANADA: ALBERTA:** Lusk  
Creek, Kananaskis Forest Experiment Station,  
Seebe, 18 June 1968, H.J. Teskey, 1♂, 1♀ (BYUC).  
**BRITISH COLUMBIA:** Chilliwack River, Vedder  
Crossing, 24 April 1938, S. Spencer, 1♀ (BYUC).  
Preacher Creek, Crawford Creek Rd, 31 May 2010,  
B. Stark, R.W. Baumann, 1♂ (BPSC). Princeton,  
Whip-saw Creek, 26 May 1968, C.H. Lindroth, 1♂  
(USNM). Summit Creek, Hwy 3, Blazed Creek Rest  
Area, 2 June 2010, R.W. Baumann, B.P. Stark, 1♀  
(BYUC). **USA: ALASKA:** Juneau, tributary of  
McGinnis Creek, 8 June 1979, R.N. Vineyard, 1♀  
(BYUC). Juneau, Granite Creek, 58.3184°N,  
134.3236°W, 25 June 2011, J.P. Hudson, 2♀ (BYUC).  
Taiya River north of Skagway, 1 July 2011, J.P.  
Hudson, 1♂ (BYUC). Prince of Wales Island,  
Tracadora Creek, 17 June 1996, unknown collector,  
1♀ (BYUC). **CALIFORNIA:** Butte Co., Butte Creek,  
1 mi above Cherry Hill Campground, 9 May 1987,  
Stanger, Maxfield, 1♂, 4♀ (BYUC). El Dorado Co.,  
Long Canyon Creek, 3 mi E Grizzly Flats, 16 May  
1998, B. Stark, C.R. Nelson, S.W. Szczytko, R.  
Bortorff, I. Sivec, 1♀ (BPSC). El Dorado Co., North  
Cosumnes River, Sciaroni Crossing, Grizzly Flats,  
21 April 1984, R. Bortorff, 3♂, 2♀ (RLBC).  
Humboldt Co., creek, 0.3 mi W Ruby Creek, Hwy  
299, 25 April 1987, R.W. Baumann, B. Stark, C.R.  
Nelson, S. Wells, 1♀ (BYUC). **IDAHO:** Bonner Co.,  
Granite Creek, Pend Oreille Lake, 15 May 1958,  
S.G. Jewett, Jr. 1♀ (BYUC). **MONTANA:**  
Broadwater Co., Deep Creek, Hwy 12, 15 May  
1969, M.L. Miner, 1♂ (BYUC). Cascade Co., Belt  
Creek, 19 mi SE Monarch, 7 July 1966, J.R.  
Grierson, 1♀ (USNM). Fergus Co., Windsor Creek,

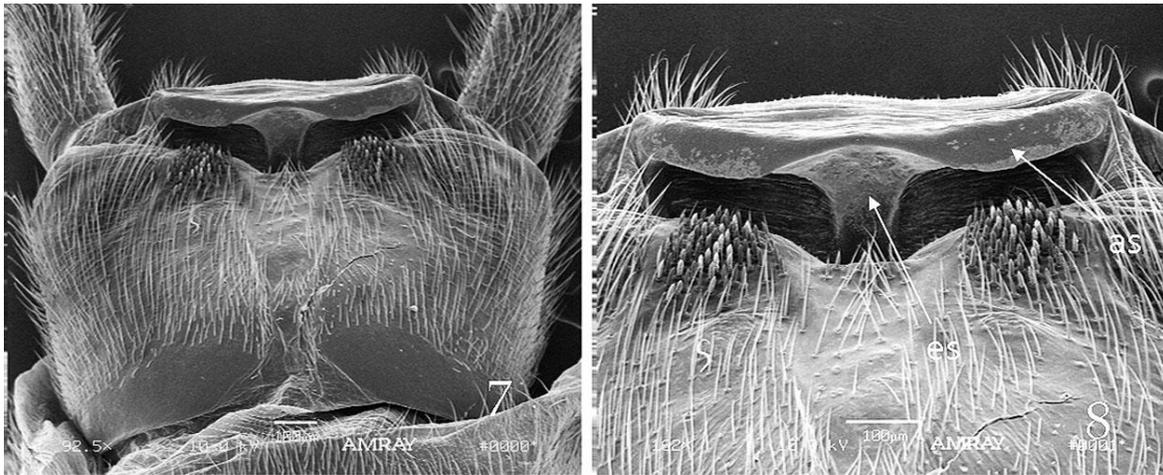


Figs. 1-6. *Kathroperla perditia* eggs. 1-4. Ross Creek, Lincoln Co., Montana. 5-6. Grande Ronde River, Union Co., Oregon. 1. Egg, lateral. 2. Chorionic detail (lt = linear tubercle; m = micropyle). 3. Collar end of egg (a = anchor). 4. Anterior pole (lid) of egg. 5. Collar end of egg (s = stria). 6. Anterior pole of egg.

Windsor Rock Campground, 3 July 1952, R. Hays, 3♂ (BYUC). Flathead Co., McDonald Creek, Glacier National Park, 15 July 1967, A.R. Gaufin, 1♀ (BYUC). Gallatin Co., Hyalite Creek, 1 June 1951, R. Hays, J. Bailey, 1♂, 1♀ (BYUC). Glacier Co., Swift Current Creek, Glacier National Park, 24 July 1967, A.R. Gaufin, 1♂ (BYUC). Glacier Co., Waterton River, Glacier National Park, 23 July 1970, C. Yarmoloy, 1♀ (BYUC). Lake Co., Yellow Bay Creek, 25 April 1970, R. Haick, 1♀ (BYUC), 1♂, 3♀ (USNM). Lewis and Clark Co., tributary Blackfoot River near Roger's Pass, Hwy 20, 17 May 1969, A.R. Gaufin, 1♀ (BYUC). Lincoln Co., Ross Creek, FR 398, Cedars Scenic Area, 27 April 2008, R. Durfee, 3♂, 3♀ (CSUC). Mineral Co., Little Joe Creek, Little Joe Campground, 25 May 2010, B. Stark, R.W. Baumann, 2♀ (BPSC). Missoula Co., Butler Creek, Snow Bowl, 12 May 1973, R.A. Haick, 9♂, 4♀ (USNM). Missoula Co., Grant Creek, Snow Bowl Rd, 9 May 1969, D.S. Potter, 1♀ (BYUC). Missoula Co., Rattlesnake Creek, Missoula Reservoir, 16 May 1969, R.W. Baumann, 1♂ (BYUC). Powell Co., Arrastra Creek, Hwy 200, 10 May 1969, M.L. Miner, 5♀ (BYUC). Ravalli Co., Roaring Lion Creek, 18 May 1998, A.L. Sheldon, 5♂ (BYUC). Ravalli Co., South Gash Creek, Rd 737, 30 May 1996, A.L. Sheldon, 1♀ (BYUC). **OREGON:** Deschutes Co., Tumalo Creek, below Tumalo Falls, 11 June 2004, R.W. Baumann, B.P. Stark, 2♂ (BYUC). Douglas Co., Muir Creek, Hwy 230, 19 May 1982, B. Stark, D. Zeigler, 1♂, 1♀ (BPSC). Hood River Co., Cold Spring Creek, nr. Elk Meadows, 23 July 1983, G.R. Fiala, 1♀ (BYUC). Linn Co., Puzzle Creek, Marion Forks Rd, 2 June 2000, B. Stark, I. Sivec, M.C. Zúñiga, 1♂ (BPSC). Umatilla Co., 11 mi E Milton-Freewater, 16 April 1952, S.G. Jewett, Jr., 2♀ (BYUC). Union Co., Five Points Creek, 28 April 1961, S.G. Jewett, Jr., 13♂ (USNM). Union Co., Five Points Creek, Grande Ronde River below Hilgard Junction, 18 June 1977, R.W. Baumann, 1♀ (BYUC). Union Co., Grande Ronde River, Bird Track Springs Campground, Hwy 244, 45° 18.027'N, 118° 18.427'W, 15 May 2014, B. Stark, A.B. Harrison, 1♀ (BPSC). **WASHINGTON:** Chelan Co., Bridge Creek, Hwy 20, Rainy Pass, 17 June 2004, B. Stark, R.W. Baumann, 1♀ (BPSC). King Co., Green River, about

10 mi abv Lester, 27 May 1969, R.W. Baumann, M.L. Miner, 1♀ (BYUC). Lewis Co., Horse Creek, FR 52, Gifford Pinchot National Forest, 15 May 2001, B.C. Kondratieff, 1♂, 1♀ (CSUC). Lewis Co., Stevens Creek, Hwy 706 E of Louise Lake, 15 June 1969, R.W. Baumann, 1♀ (BYUC). Lewis Co., Sunbeam Creek, Hwy 706, 47° 19'N, 122° 06'W, Mt. Rainier National Park, 21 June 2003, B.C. Kondratieff, R.E. Zuellig, J. Schmidt, 1♂ (CSUC). Okanogan Co., Foggy Dew Creek, 8 mi SW Carlton, 18 July 1995, G. MacKenzie, 1♀ (BYUC). Pierce Co., Fryingpan Creek, Mt. Rainier National Park, 24 May 2003, B.C. Kondratieff, J. Schmidt, 1♂ (CSUC). Pierce Co., White River, Sunrise Rd, Mt. Rainier National Park, 15 June 2001, R. Lechleitner, 1♀ (CSUC). Pierce Co., White River, Hwy 410, 14 May 2001, B.C. Kondratieff, R. Lechleitner, 1♀ (CSUC). Pierce Co., unnamed stream N of Crystal Creek, Hwy 410, Mt. Rainier National Park, 29 May 1997, B.C. Kondratieff, R. Lechleitner, 2♀ (CSUC). Yakima Co., American River, Pleasant Valley Campground, 10 June 2001, D. Strenge, 2♀ (CSUC). **Egg.** Outline oval. Length ca. 390-410 µm, equatorial width ca. 263-267 µm (Fig. 1). Collar short, wide with sides elaborately dissected; base surrounded by a low, irregularly-multitoothed rim. Anchor mushroom shaped and abundantly covered with globular bodies (Figs. 1, 3). Surface covered with widely-spaced, irregular striae along longitudinal axis; striae composed of linear tubercles ca. 20-25 µm long and ca. 5-10 µm thick (Figs. 2-6). Surface between striae relatively smooth, but bearing a few, scattered globular bodies. Micropyles subequatorial in position, located on modified strial elements (Fig. 2); orifices smaller than width of strial tubercles.

**Comments.** The images (Fig. 13 in Stark & Surdick 1987; Fig. 1.9 in Stark et al. 1998a) prepared from eggs taken from a Muir Creek, Oregon female collected in May 1982 are consistent with the images presented herein from Montana and Oregon, and also consistent with eggs from California and Washington specimens examined from the sites listed above. One female from Humboldt Co., California had eggs typical of this species, although eggs from other specimens collected in that area were typical of *K. tahoma*. No



Figs. 7-8. *Kathroperla perdita* male terminalia, Roaring Lion Creek, Ravalli Co., Montana. 7. Tergum 10 and epiproct, dorsal. 8. Detail of epiproct, dorsal (as = anterodorsal sclerite; es = epiproct stem).

eggs were present in specimens examined from Alaska, but one Canadian female from Summit Creek, British Columbia contained eggs which were typical of *K. perdita*. Scanning electron micrographs (Figs. 7-8) are provided to show the relatively straight anterodorsal margin of the *K. perdita* male epiproct. In this species and *K. siskiyou*, described below, the smooth, sclerotized anterodorsal margin is completely black, whereas this structure is usually bicolored with a brown band appearing adjacent to the marginal black pigmented area in *K. takhoma*. The anterodorsal margin of the epiproct of *K. perdita* is also straighter than either of the other species.

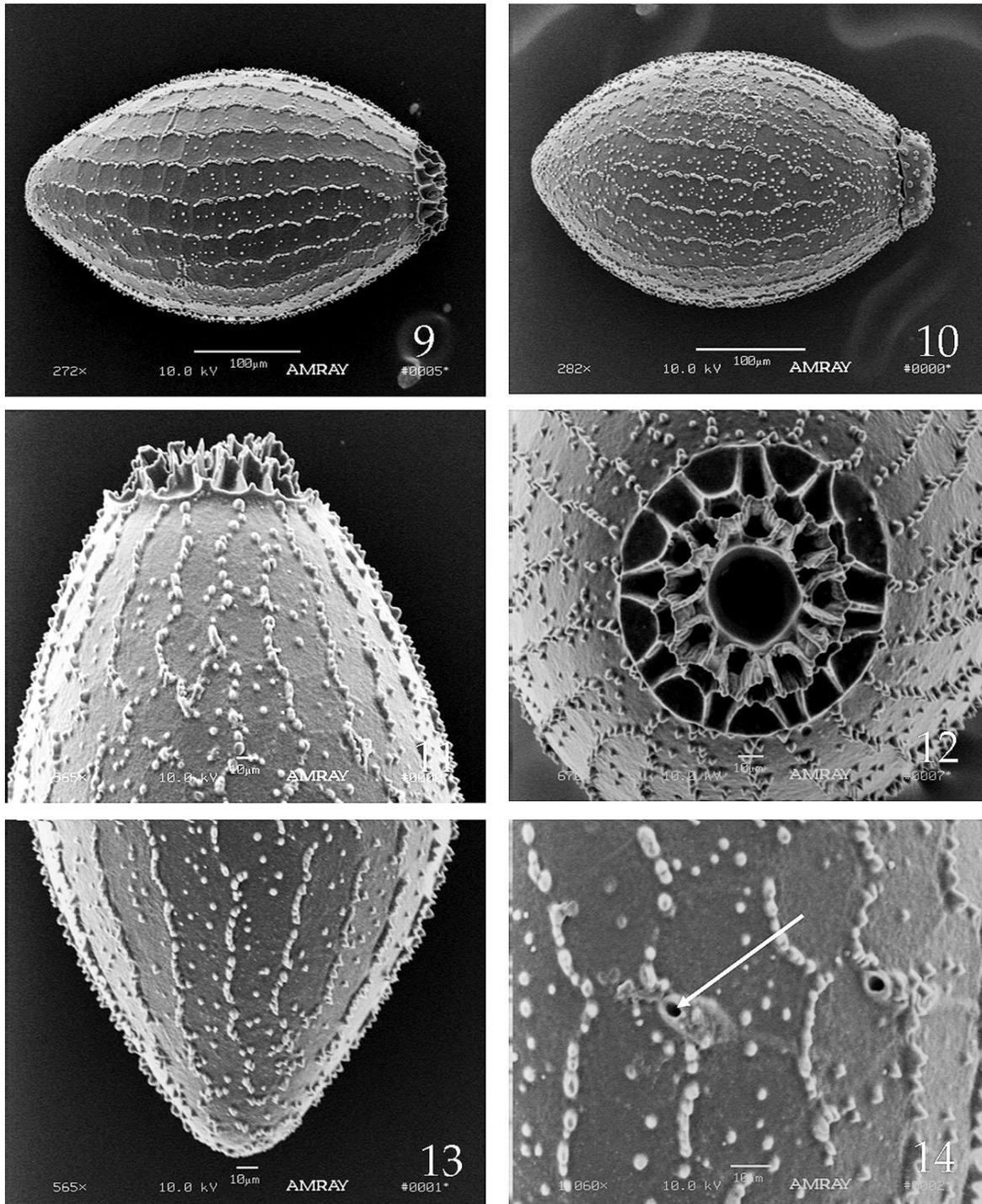
**Distribution.** The species is reported from Canada: Alberta and British Columbia, and the United States: Alaska, California, Idaho, Montana, Nevada, Oregon and Washington (Baumann et al. 1977; Kondratieff & Lechleitner 2002; Stark & Surdick 1987; Stewart & Oswood 2006; Stewart & Ricker 1997; Stewart & Stark 2002).

*Kathroperla siskiyou* Stark & Kondratieff sp. n.  
Wagner Gap Sallfly  
(Figs. 9-19)

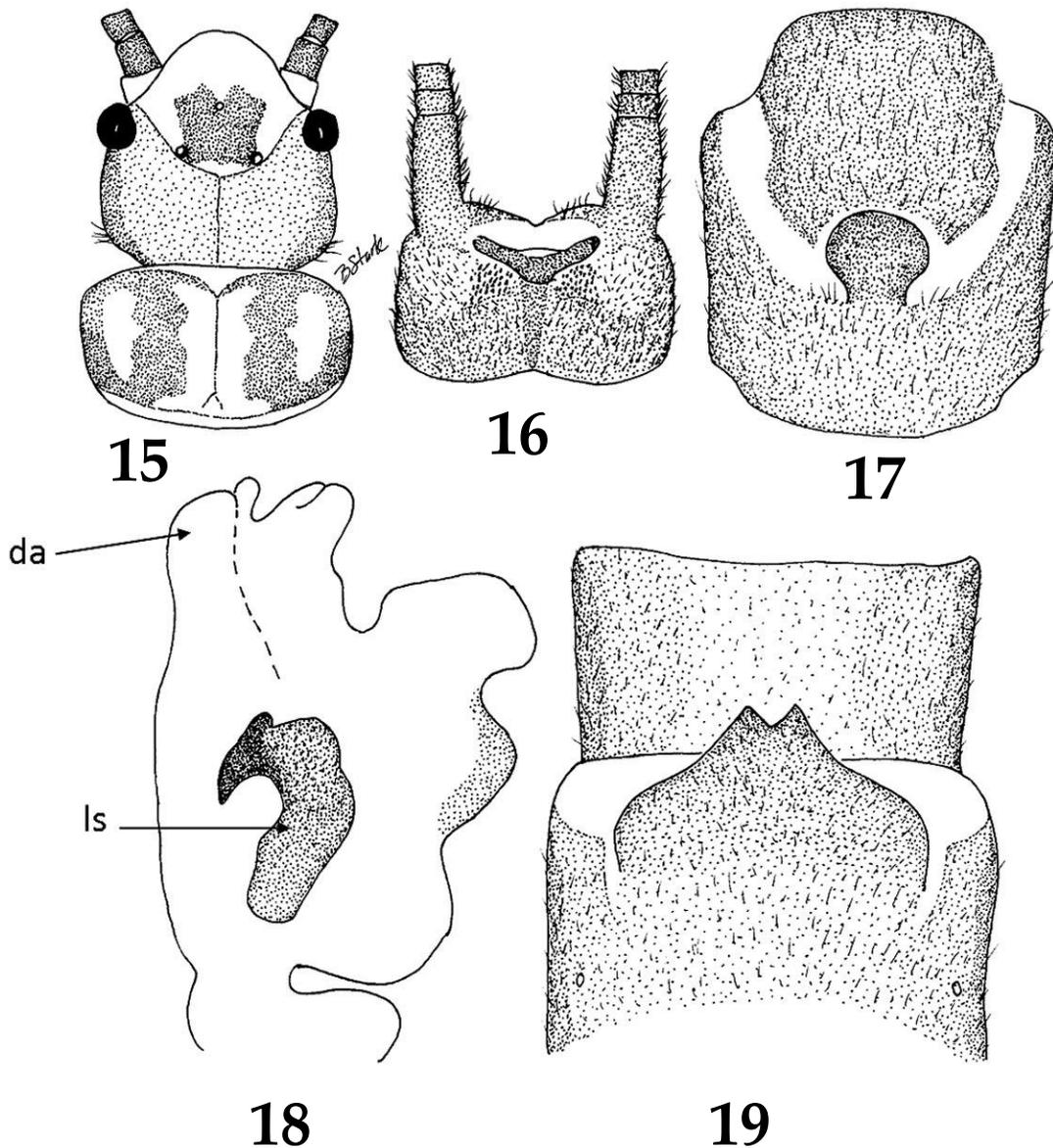
**Material examined.** Holotype ♀, USA: OREGON,

Jackson Co., Split Rock Creek, Wagner Gap Rd, 12 mi S Talent, 42.09480°N, 122.77397°W, 22 May 2014, B.C. Kondratieff, C.J. Verdone, J. Sandberg, B. Stark (USNM). Paratypes, CALIFORNIA: Sierra Co., North Yuba River, Hwy 49, near Sierra City, 10 May 1983, R.W. Baumann, R.C. Mower, 1♀ (BYUC). OREGON: Same data as holotype, 2♀ (CSUC). Jackson Co., East Fork Ashland Creek, south of Ashland, 19 May 2000, R.W. Wisseman, 1♀ (BYUC). Jackson Co., McDonald Creek, Wagner Gap Rd, 22 May 2014, B.C. Kondratieff, C.J. Verdone, 1♂ (CSUC).

**Adult habitus.** General color brown patterned with dark brown. Lateral margins of head bearing dark brown stripes extending from posterior margin to eye (Fig. 15); occiput pale brown in fully pigmented specimens, but infuscated in some specimens with slightly darker brown pigment. Dark ocellar spot extends forward on frons to level of antennae; antennae dark brown. Pronotum with pale brown median stripe, broad sublateral dark stripes, and an almost complete marginal ring of dark pigment interrupted on lateral margins near midlength (Fig. 15); sublateral stripes sometimes almost broken, or notched on lateral margins. Wings transparent, veins dark brown except pale brown C and Sc. Femora brown except apical black



Figs. 9-14. *Kathroperla siskiyou* eggs, Split Rock Creek, Jackson Co., Oregon. 9. Entire egg, lateral aspect. 10. Entire egg with intact anchor. 11. Collar end chorionic detail. 12. Collar, apical aspect. 13. Anterior pole. 14. Chorionic detail (micropyle at arrow).



Figs. 15-19. *Kathroperla siskiyou* adult features. 15. Head and pronotum. 16. Male terminalia, dorsal. 17. Male sternum 9 with vesicle. 18. Male aedeagus, lateral (da = dorsoapical lobe; ls = lateral sclerite). 19. Female terminalia, ventral.

ring; tibiae brown but slightly darker distally, proximally at knee and along inner margin. Abdomen pale brown on dorsum and bearing a darker median stripe and a pair of dark lateral stripes on terga 1-8; basal cercal segment pale

brown but bearing minute dark spots around setal bases, subsequent segments black. Thoracic sterna dark brown; abdominal sterna brown with darker markings forming a broken, median longitudinal stripe from sterna 3-7.

**Male.** Forewing length 16 mm. Epiproct typical of genus but dorsolateral extensions diverge posterolaterally from central axis (Fig. 16); anterodorsal margin of epiproct uniformly black. Basal cercal segments ca. 2-2.5 X long as wide. Vesicle body almost circular but with moderately wide base forming a short, stalk-like structure (Fig. 17). Aedeagus broad and membranous except for a pair of curved, dark brown lateral bands and a ventromedian pale sclerite (Fig. 18); surface of lateral bands bear fine, short, densely packed setae; distal margins foot-shaped. Aedeagal apex consists of three membranous lobes, median lobe finely divided by a suture-like line along most of its length.

**Female.** Forewing length 17-18 mm. Lateral margins of subgenital plate slightly concave beyond midlength, apex notched; apex extends over base of sternum 9 (Fig. 19).

**Egg.** Outline oval. Length ca. 380-400  $\mu\text{m}$ , equatorial width ca. 230-240  $\mu\text{m}$  (Figs. 9-10). Collar short, ca. 22-30  $\mu\text{m}$ , wide ca. 70-80  $\mu\text{m}$  (Fig. 11), elaborately dissected, and surrounded by three irregular rows of meshes and a conspicuous outer ridge forming a ring ca. 104  $\mu\text{m}$  in diameter (Figs. 11-12). Anchor well developed, cushion shaped and covered with small globular bodies (Fig. 10). Chorion bearing multiple rows of longitudinal striae composed of closely grouped, irregularly shaped tubercles ca. 2-3  $\mu\text{m}$  wide; interstrial areas bear scattered tubercles similar to those which comprise striae (Figs. 11, 13). Micropyles subequatorial in position and often associated with striae (Fig. 14); orifices slightly larger in diameter than bead-like components of striae.

**Larva.** Unknown.

**Etymology.** The species name, used as a noun in apposition, is based on the type locality in the Siskiyou Mountains of southern Oregon. The proposed common name, Wagner Gap Sallfly, is based on the access road into the sites where most of the known specimens were collected. Common names for *K. perdit*a (Longhead Sallfly) and *K. takhoma* (Slenderhead Sallfly) were previously proposed by Stark et al. (1998b; 2012).

**Diagnosis.** Although some overlap in subgenital plate shape occurs, females of *K. siskiyou* are

usually distinguished from *K. takhoma* by a shorter subgenital plate, and by the egg structure which bears a collar and longitudinal striations formed from bead-like tubercles (Figs. 11, 13). The new species and *K. perdit*a completely overlap in subgenital plate structure and in head pattern, but the eggs differ in the form of the chorionic tubercles. In *K. perdit*a these structures are thick and long (Figs. 5-6), whereas in the new species they are formed as longitudinal clusters of bead-like structures (Figs. 11, 13). The only known male specimen of this species appears intermediate between *K. perdit*a and *K. takhoma*. The basal cercal segments and, general head coloration and pigment pattern of the dorsal margin of the epiproct are similar to those of *K. perdit*a, whereas the vesicle shape and dorsal epiproct margin are more similar to *K. takhoma*. Males of the three Nearctic species have similar aedeagal structure but when a larger sample is available the shape and size of the lateral sclerites may offer another useful character. We offer a preliminary key below to assist in distinguishing these three species.

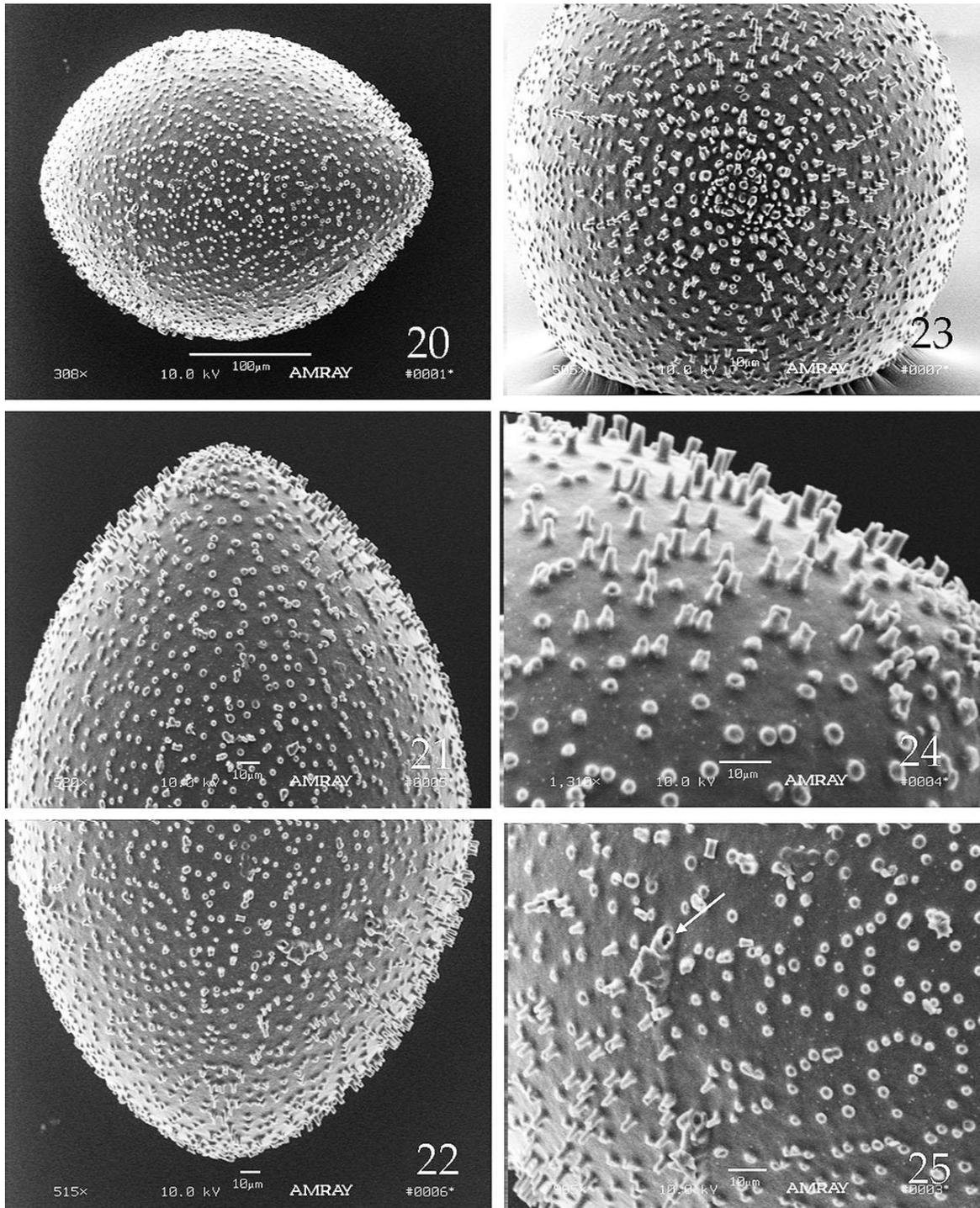
### *Kathroperla takhoma* Stark & Surdick

Slenderhead Sallfly

(Figs. 20-25)

*Kathroperla takhoma* Stark & Surdick 1987:527.  
Holotype ♀ (United States National Museum), Falls Creek above Ohanapecosh River, Mt. Rainier National Park, Hwy 706, Washington

**Material examined. USA: CALIFORNIA:** Del Norte Co., 3 mi NE Hiouchi, 1 June 1991, B. Stark, R.W. Baumann, C. Henderson, 1♀, 1 larva (BPSC). Humboldt Co., Cedar Creek, Hwy 299, 25 April 1987, B. Stark, R.W. Baumann, C.R. Nelson, 2♂, 5♀ (BPSC). Humboldt Co., 1 mi E Cedar Creek, Hwy 299, 25 April 1987, B. Stark, R.W. Baumann, C.R. Nelson, 1♂ (BPSC). Humboldt Co., East Fork Willow Creek, East Fork Willow Creek Campground, 24 April 1987, B. Stark, R.W. Baumann, C.R. Nelson, 1♂, 4♀ (BPSC). Humboldt Co., Slide Creek, Hwy 13 south of Fish Lake Campground, 31 May 1991, B. Stark, R.W. Baumann, C. Henderson, 1♀ (BPSC), 2♀ (BYUC). Mendocino Co., Irish Gulch, 39° 01.209'N, 123°



Figs. 20-25. *Kathroperla takhoma* eggs, Bridal Veil Creek, Multnomah Co., Oregon. 20. Entire egg, lateral aspect. 21. Collar end chorionic detail. 22. Anterior pole. 23. Collar, apical aspect. 24. Chorionic detail adjacent to collar. 25. Chorionic detail (micropyle at arrow).

41.268'W, 22 April 2005, L.D. Bottorff, 1♀ (RLBC). Mendocino Co., Same location, 2 April 2005, L.D. Bottorff, 1♂ (RLBC). Trinity Co., Clear Creek and tributaries, Hwy 36, 2.6 mi E of Forest Glen Campground, 40.3743°N, 123.3634°W, 9 May 2009, J.B. Sandberg, 2♂, 2♀, 1 larva, 2 exuvium (JBSC). **OREGON:** Benton Co., Yew Creek, Mary's Peak Rd, 1 June 2000, B. Stark, I. Sivec, M. Zúñiga, 1♀ (BPSC). Benton Co., Lewisburg Saddle, Malaise trap, 44.6423°N, 121.4204°W, 31 May-12 June 2013, S. Fitzgerald, 5♂, 8♀ (CSUC). Same location, Malaise trap, 6-31 May 2013, S. Fitzgerald, 2♀ (CSUC). Lane Co., Watershed #10, Anderson Experimental Forest, 20 April 1972, R.W. Wisseman, 1♂, 1♀ (BYUC). Linn Co., tributary North Santiam River, Hwy 22, 0.2 mi below Minto Rd, 3 June 2000, B. Stark, I. Sivec, M. Zúñiga, 1♀ (BPSC). Multnomah Co., Bridal Veil Creek below Bridal Veil Falls, 13 May 2003, B.C. Kondratieff, R.W. Baumann, 1♀ (CSUC). Multnomah Co., Columbia River junction with Tanner Creek, 28 March 1987, G.R. Fiala, 1♂ (BYUC). **WASHINGTON:** Clallam Co., Madison Creek, Madison Creek Falls, Elwah River Valley, Olympic National Park, 48° 02'N, 123° 35'W, 15 June 2005, R.W. Baumann, B.C. Kondratieff, 1♀ (BYUC). Jefferson Co., Mineral Creek, tributary Hoh River, N 102-103, E 33-34, 24 June 1999, D.E. Bowles, 1♀ (BYUC). Lewis Co., Faith Creek, Hwy 706, Mt. Rainier National Park, 17 June 2004, B.C. Kondratieff, J. Schmidt, 2♀ (CSUC). Lewis Co., St. John Creek, Rt. 22, 13 mi E Rt. 23, 1 July 1985, C.M. Flint, O.S. Flint, Jr., 2♂ (USNM). Lewis Co., tributary Ohanapecosh River, Mt. Rainier National Park, 7 July 1999, B.C. Kondratieff, 1♀ (CSUC). Mason Co., Brown Creek, FR 2233, 12 mi NW Shelton, 22 April 1995, T.Nash, 1♂ (BYUC). Skamania Co., Rock Creek, Millard, tributary Little Salmon River, 15 May 2003, B.C. Kondratieff, R.W. Baumann, 1♂ (CSUC). Skamania Co., tributary Little White Salmon River, near Oklahoma Campground, 27 May 1984, G.R. Fiala, 1♀ (BYUC). Whatcom Co., Breckenridge Creek, 5 mi E Eversen, 11 May 1967, unknown collector, 1♀ (BYUC). Whatcom Co., Canyon Creek, Deming, 21 April 1967, unknown collector, 1♂ (BYUC). Whatcom Co., Sygitowicz Creek, 2 mi SW Van Zandt, 5 May 1994,

Kraft and Sammeth, 1♂ (BYUC).

**Egg.** Outline oval, collar absent (Figs. 20-21, 23). Length ca. 431 µm, equatorial width ca. 253 µm. Collar end of egg bearing a dense cluster of small tubercles (Fig. 23). Chorionic surface sparsely covered throughout with small, projecting tubercles of irregular height (Figs. 23-25); some tubercles are grouped in poorly organized, short rows but most appear randomly placed. Micropyles subequatorial in position and frequently located in association with tubercles (Fig. 25).

**Distribution.** This species has previously been reported from California and Washington (Bottorff & Bottorff 2007; Kondratieff & Lechleitner 2002; Nelson & Stark 1987; Stark & Surdick 1987). The Oregon records listed above, though not unexpected, are the first reports from that state.

#### Preliminary Key to Nearctic *Kathroperla* Species

- 1 Lateral pronotal margin of adults usually entirely yellow; female subgenital plate usually reaching posterior margin of sternum 9 (Fig. 4 in Stark & Surdick 1987); egg collar absent and chorionic striations absent (Figs. 20-25); dorsal margin of epiproct usually bicolored with a black anterior band adjacent to a dark brown band (Fig. 1 in Stark & Surdick 1987); basal male cercal segments about 3 times long as wide ..... *K. takhoma*
- 1' Lateral pronotal margins of adults with black pigment extending at least a third of the margin length, but often completely dark (Fig. 15); egg collar present, chorionic striations present although sometimes indistinct (Figs. 1-6, 9-14); dorsal margin of epiproct narrow and black; basal male cercal segments about 2-2.5 times long as wide ..... 2
- 2 Dorsolateral margin of male epiproct slanted conspicuously caudad (Fig. 16); egg chorion covered with fine bead-like tubercles poorly organized into striations (Figs. 9-14) ..... *K. siskiyou*
- 2' Dorsal margin of male epiproct almost straight; egg chorion covered with thick tubercles

organized into well-developed longitudinal striations (Figs. 1-6) ..... *K. perdit*

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#### REFERENCES

Banks, N. 1920. New neuropteroid insects. Bulletin of the Museum of Comparative Zoology, 64:299-362.

Baumann, R.W., A.R. Gaufin, & R.F. Surdick. 1977. The stoneflies (Plecoptera) of the Rocky Mountains. *Memoirs of the American Entomological Society*, 31:1-208.

Bortorff, R.L. & L.D. Bortorff. 2007. Phenology and diversity of adult stoneflies (Plecoptera) of a small coastal stream, California. *Illiesia*, 3:1-9.

Kondratieff, B.C. & R.A. Lechleitner. 2002. Stoneflies (Plecoptera) of Mount Rainier National Park, Washington. *Western North American Naturalist*, 62:385-404.

Needham, J.G. & P.W. Claassen. 1925. A Monograph of the Plecoptera or Stoneflies of America North of Mexico. Thomas Say Foundation, 397 pp.

Nelson, C.R. & B.P. Stark. 1987. The *Salmoperla* safari: Hit and run stonefly collecting in Nevada and California. *Perla*, 8:7-11.

Sivec, I. & B.P. Stark. 2002. The species of *Perla* (Plecoptera: Perlidae): Evidence from egg morphology. *Scopolia*, 49:1-33.

Sivec, I. & B.P. Stark. 2008. New species of *Kamimuria* Klapálek (Plecoptera: Perlidae) from Thailand and Vietnam, with notes on Chinese species. *Illiesia*, 4:110-138.

Stark, B.P. 2010. Studies on Korean stoneflies (Insecta: Plecoptera) with descriptions of two new species. *Illiesia*, 6:1-10.

Stark, B.P. & R.W. Baumann. 1978. New species of Nearctic *Neoperla* (Plecoptera: Perlidae), with notes on the genus. *Great Basin Naturalist*, 38:97-114.

Stark, B.P. & I. Sivec. 2008. New species and records of *Neoperla* (Plecoptera: Perlidae) from Vietnam. *Illiesia*, 4:19-54.

Stark, B.P. & R.F. Surdick. 1987. A new *Kathroperla* species from western North America (Plecoptera: Chloroperlidae). *Proceedings of the Entomological Society of Washington*, 89:527-531.

Stark, B.P. & S.W. Szczytko. 1976. The genus *Beloneuria* (Plecoptera: Perlidae). *Annals of the Entomological Society of America*, 69:1120-1124.

Stark, B.P., S.W. Szczytko, & C.R. Nelson. 1998a. American stoneflies: A Photographic Guide to the Plecoptera. The Caddis Press, Columbus, Ohio. 126 pp.

Stark, B.P., K.W. Stewart, S.W. Szczytko, & R.W. Baumann. 1998b. Common names of stoneflies (Plecoptera) from the United States and Canada. *Ohio Biological Survey Notes*, 1:1-18.

Stark, B.P., K.W. Stewart, S.W. Szczytko, R.W. Baumann, & B.C. Kondratieff. 2012. Scientific and common names of Nearctic stoneflies (Plecoptera), with corrections and additions to the list. *Miscellaneous Contributions No. 1*. The Caddis Press, Columbus, Ohio. 20 pp.

Stewart, K.W. & M.W. Oswood. 2006. The Stoneflies (Plecoptera) of Alaska and Western Canada. The Caddis Press, Columbus, Ohio. 325 pp.

Stewart, K.W. & W.E. Ricker. 1997. Stoneflies (Plecoptera) of the Yukon. Pp. 201-222 in Danks, H.V. & J.A. Downes (Eds.). *Insects of the Yukon*. Biological Survey of Canada (Terrestrial Arthropods). Ottawa, Ontario, Canada. 1034 pp.

Stewart, K.W. & B.P. Stark. 2002. *Nymphs of North American Stonefly Genera* (Plecoptera). Second edition. The Caddis Press, Columbus, Ohio. 510 pp.

Szczytko, S.W. & K.W. Stewart. 1979. The genus *Isoperla* (Plecoptera) of western North America;

Stark, B.P., B.C. Kondratieff, and C.J. Verdone. 2015. *Kathroperla siskiyou*, a new stonefly species from California and Oregon, U.S.A. (Plecoptera: Chloroperlidae). *Illiesia*, 11(08):92-103. Available online: <http://illiesia.speciesfile.org/papers/Illiesia11-08.pdf>

Holomorphy and systematics and a new stonefly genus *Cascadoperla*. *Memoirs of the American Entomological Society*, 32:1-120.

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