

**A NEW SPECIES OF *WIEDEMANNIA* ZETTERSTEDT FROM  
GRAND CANYON NATIONAL PARK, WITH NOTES ON  
ADDITIONAL NEARCTIC SPECIES (DIPTERA: EMPIDIDAE)**

B. J. SINCLAIR<sup>1</sup>

Zoologisches Forschungsmuseum Alexander Koenig,  
Adenauerallee 160, D-53113 Bonn, Germany  
email:sinclairb@inspection.gc.ca

**Abstract**

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*Wiedemannia digna* sp. nov. is described from Grand Canyon National Park (Arizona, USA) and additional records of *W. apicalis* Sinclair, *W. lepida* (Melander), and *W. simplex* (Loew) are listed. An updated key to North American species is also provided.

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**Introduction**

With the description of a new species below, there are now seven species of *Wiedemannia* known from North America. The rarest species remains *W. vexillum* Sinclair, known only from the holotype collected in the Northwest Territories. In addition to the description of a new species, new locality records for *W. lepida* (Melander), *W. apicalis* Sinclair, and *W. simplex* (Loew) discovered since the last revision of this genus (Sinclair 1998) are provided.

Adult *Wiedemannia* are common on emergent rocks in large creeks and rivers, where there is little overhead riparian vegetation (i.e., sunny, exposed sites). In North America, species of *Wiedemannia* are confined to northern and western regions, ranging from beyond the treeline in northern Canada south to New Mexico and Arizona (Sinclair 1998). There are no records of this genus further south into Mexico or Central and South America.

**Materials and Methods**

This study is based on Diptera housed or deposited in the Canadian National Collection of Insects, Ottawa, Ontario (CNC), Colorado State University, Fort Collins, Colorado (CSU), University of Guelph, Guelph, Ontario (DEBU), United States National Museum of Natural History, Washington, DC (USNM), and Zoologisches

<sup>1</sup> Current address: Canadian Food Inspection Agency, K. W. Neatby Bldg., C.E.F., 960 Carling Avenue, Ottawa, Ontario, Canada K1A 0C6

Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK).

Terms used for adult structures primarily follow those of McAlpine (1981). Homologies for the male terminalia follow Sinclair (2000). To facilitate observations, the male terminalia were macerated in hot 85% lactic acid and immersed in glycerine.

### **Key to the Nearctic species of *Wiedemannia* (updated from Sinclair 1998)**

1. Acrostichals biserial, extending to the scutellum .....2  
 – Acrostichals inconspicuous, extending at most to second dorsocentral bristle .....  
 .....5
2. Base of apical filament of phallus with flag-like structure bearing stout spines .....  
 .....*W. vexillum* Sinclair  
 Note: Females of *W. vexillum* and *W. digna* are unknown. Females of *W. undulata* Sinclair and *W. simplex* (Loew) are generally indistinguishable, but may be tentatively separated on the basis of geographic distribution and association with males. See Sinclair (1998).  
 – Base of apical filament of phallus lacking flag-like structure with stout spines .....3
3. Ocellar bristles distinctly shorter than scutal bristles, ca. two-thirds length of the postpronotal bristles .....*W. digna* sp. nov.  
 – Ocellar bristles subequal in length to scutal bristles .....4
4. Anterior and posterior lobes of clasping cercus of similar length; setae of inner surface of posterior lobe straight, much shorter than width of lobe .....  
 .....*W. simplex* (Loew)  
 – Anterior lobe of clasping cercus half length of posterior lobe; most setae of inner surface of posterior lobe sinuous, 2-2.5 times longer than width of lobe .....  
 .....*W. undulata* Sinclair
5. Anteroapical margin of wing with a distinct dark spot between  $R_{2+3}$  and  $R_4$  .....  
 .....*W. apicalis* Sinclair  
 – Anteroapical margin of wing with faint cloudy spot between  $R_{2+3}$  and  $R_4$  or spot lacking .....6
6. **Width of gena equal to half height of eye; acrostichals extending to almost second dorsocentral bristle; apical margin of wing lacking cloudy spot; 5-7 dorsocentral bristles present** .....*W. lepida* (Melander)  
 – **Width of gena less than half height of eye; acrostichals not extending posterior of first dorsocentral bristle; apical margin of wing with a faint cloudy spot, or sometimes inconspicuous; 5 dorsocentral bristles present** .....*W. uncinata* Sinclair

***Wiedemannia apicalis* Sinclair**

*Wiedemannia apicalis* Sinclair, 1998: 340.

**Recognition.** This species is readily distinguished by its distinctive darkened wing tips.

**Material examined.** CANADA, **British Columbia:** Kootenay NP, Radium Hot Springs, Sinclair Ck, 1020 m, 9 September 2003, 17 September 2005, B. J. Sinclair, 19♂, 10♀, CNC, DEBU, ZFMK. **UNITED STATES, Montana:** Glacier NP, 11 August 1993, P. H. Arnaud Jr., 2♀, USNM.

**Geographical distribution and seasonal occurrence.** This species is rarely encountered when compared to other species of *Wiedemannia* from western North America. It was previously known from scattered localities along the Rocky and Sierra Nevada Mountain ranges in California, Colorado, Idaho, Nevada, and Utah (Sinclair 1998).

These records represent the first known occurrence of this species from Montana and Canada and extend its distribution range much further north. In the cold mountain stream in Kootenay NP, *W. apicalis* was collected together with *Clinocera fuscipennis* Loew, *C. lecta* Melander, and *Trichoclinocera rupestris* Sinclair.

***Wiedemannia digna* sp. nov.**

**Etymology.** The specific name is from the Latin *dignus* (worthy, deserving, honourable), in recognition of Prof. D. H. Pengelly's dedication to entomology and to the University of Guelph Insect Collection.

**Type Material.** Holotype male labelled: "USA:AZ:Grand Canyon NP/ Vasey's Paradise/ 10.v.1998/ J.F. MacDonald" (USNM). Paratype: Same data as holotype, ♂, USNM.

**Recognition.** This species is distinguished from the other large-sized species of *Wiedemannia* by the reduced ocellar bristles which are shorter than the thoracic bristles, lateral margin of the scutum with blue pruinescence, and the form of the clasping cercus with its broad posterior lobe.

**Description. Male.** Face, gena, and postocciput with blue pruinescence, vertex brown; ocellar setae short, ca. two-thirds postpronotal bristle. Width of gena less than one-third height of eye. Arista short, tip blunt. Setae on palpus dark.

Pleura, prescutellar depression, postpronotal lobe, lower notopleuron, and scutellum with blue pruinescence; scutum faintly bivittate. Acrostichals biserial, diverging around prescutellar depression, extending onto scutellum; 5 dorsocentral bristles, 1-2 short setae interspersed; 1 postpronotal bristle and several short setae; 1 presutural supra-alar bristle; 2 notopleural bristles; 0 postsutural supra-alar bristles; 1 postalar bristle; 2 scutellar bristles and inner and outer marginal setae; scattered setae on notopleuron and presutural supra-alar regions. Postnotum with patch of pale setae; antepnotum with pale setae.

Wing broad, faintly infusate; stigma elongate; single basal costal seta. Anal vein reduced to streak; cell dm elongate, M acutely branched or  $M_1$  and  $M_2$  separated;  $R_4$  and  $R_5$  straight and divergent.

Coxae with blue pruinescence, remaining segments dark. All legs with evenly distributed setae. Anterior surface of fore femur lacking macrosetae. Fifth tarsomere with dorsoapical extension; empodium pulvilliform, subequal to length of claw.

Abdominal sternites, lateral portion of tergites, and hypopygium with blue pruinescence. Tergite 8 bilobed. Phallus straight, distiphallus with median swelling; ejaculatory apodeme long and narrow. Surstylus small and pointed. Cercal plate with macrosetae confined to dorsal tubercle. Clasping cercus mitten-shaped, anterior lobe (“thumb”) much shorter than posterior (“fingers”) lobe; anterior lobe slightly longer than wide somewhat tapered to narrow apex, shiny and lacking blue pruinescence; posterior lobe expanded apically, somewhat rounded, bearing long lateral setae subequal to width of posterior lobe; setae of inner surface short, pale, with expanded or clubbed tips especially on anterior lobe (Fig. 1).

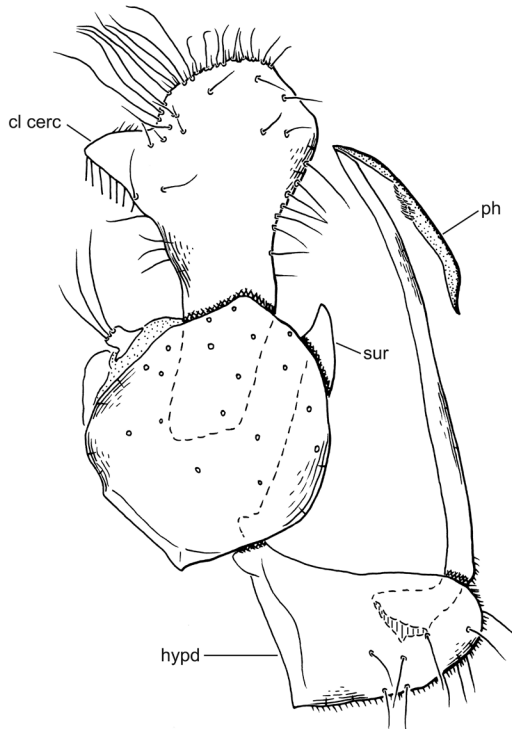


FIGURE 1. Male terminalia of *Wiedemannia digna* sp. nov., lateral view. Abbreviations: cl cerc—clasping cercus; hypd—hypandrium; ph—phallus; sur—surstylus.

**Female.** Unknown.

**Geographical distribution and seasonal occurrence.** *Wiedemannia digna* is currently known only from the type locality, collected in May. The specimens were collected from a large spring stream on the western side of Marble Gorge at mile 32 of the Colorado River at Vasey's Paradise (J. MacDonald pers. comm.). The stream emerged about 50-70 m above the river and flowed down over the talus slope to the Colorado River. The specimens were collected from large boulders just above the water line of this spring stream.

**Phylogenetic relationships.** *Wiedemannia digna* is very closely related to *W. simplex* and *W. undulata*, which are also found in the region. This complex of species forms the *W. simplex* group and also includes several European species (see Sinclair 1998).

### *Wiedemannia lepida* (Melander)

*Clinocera lepida* Melander, 1902: 241.

**Recognition.** Males are distinguished by their subtriangular to rounded clasping cercus (Sinclair 1998).

**Material examined.** UNITED STATES, Colorado: Garfield Co., Grizzly Ck, I-70 rest-stop, 2 July 1996, H. Evans, S. Fitzgerald, B. Kondratieff, D. Leatherman, 2♂, 14♀, CSU.

**Geographical distribution and seasonal occurrence.** This species is found in streams along the coast and Cascade ranges from southern British Columbia to California and along the Rocky Mountains from British Columbia to Wyoming and Colorado (Sinclair 1998). The above specimens represent a new county record for Colorado. The species was previously known from Boulder (Boulder Falls), Routt (Steamboat Springs), and Larimer (Youngs Gulch, Sheep/Buckhorn Creeks) counties.

### *Wiedemannia simplex* (Loew)

*Clinocera simplex* Loew, 1862: 207.

**Recognition.** Males are distinguished by the characters provided in the above key to species.

**Material examined.** UNITED STATES, Arizona: Yavapai Co., Oak Creek Canyon near Sedona, 10 August 2004, K. Yoshizawa, 3♂, 1♀, CNC. Coconino Co., Oak Creek Canyon, Cave Springs Cpgd, 4500', 21 May 1971, P. H. & M. Arnaud, 11♂, 14♀, USNM.

**Geographical distribution and seasonal occurrence.** This species is widely distributed in rivers in the far north of North America, with several records known from the Rocky

Mountains (Sinclair 1998). *Wiedemannia simplex* is also recorded from several isolated populations in Arizona (Navajo County: White River, west of Fort Apache) and New Mexico (Grant and Catron counties). The above specimens represent new county records for Arizona.

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