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A NEW SPECIES OF *IRONOQUIA* (TRICHOPTERA: LIMNEPHILIDAE) FROM AN INTERMITTENT SLOUGH OF THE CENTRAL PLATTE RIVER, NEBRASKA¹

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ABSTRACT: *Ironoquia plattensis*, a new limnephilid caddisfly species, is described from both males and females. The new species is similar to *Ironoquia parvula* but is easily distinguished based on its apically, unforked parameres and the shape of inferior appendages, upper cercal lobes and the supra-phallic plate. The new species is presently known only from one site on Mormon Island in the central Platte River valley, Nebraska. The site is a stopover point and staging grounds for migrating whooping cranes, sandhill cranes and various other waterfowl.

An aquatic ecology and biomonitoring study was conducted on a primary waterfowl migration stopover and staging area on the central flyway for various species including the endangered whooping crane (*Grus americana*). This area is located in the central Platte River valley on land owned by the Platte River Whooping Crane Trust in Hall County, Nebraska. During this study, a species of terrestrially pupating *Ironoquia* Banks was discovered in an intermittent slough on Mormon Island. This species was much smaller and morphologically distinct from *Ironoquia punctatissima* (Walker, 1852) which is the common species of *Ironoquia* on the Great Plains. Comparisons made to specimens, borrowed from the Illinois Natural History Survey (INHS), of the other four species in this genus (Morse, 1993) indicated that the specimens from the Platte River represented a previously undescribed species. Further investigations indicated that this new species was very similar to *Ironoquia parvula* (Banks, 1900), which is distributed in northeastern North America and its farthest westerly distribution reported in the literature to date is in Ohio (Huryn and Foote, 1983; J.C. Morse personal comm.). Descriptions of both the male and female, as well as a diagnosis, are provided here. The holotype and a paratype female are deposited at the Illinois Natural History Survey (INHS) and paratypes are deposited at Kansas State University (KSU), the National Museum of Natural History (NMNH) and the collection of the senior author (KDA).

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Ironoquia plattensis, NEW SPECIES

Figs. 1-4

Male. Body length 6.0 - 6.5 mm. Forewing length 7.0 - 8.0 mm. General color pale brown. Wing membranes and veins brown with small, pale spotting. Genitalia as in Figure 1A and 2. Inferior appendages triangular and projecting slightly posteriorly (Figs. 1A, 2 and 3C,E). Cerci laterally compressed and divided into dorsal and ventral lobes. Dorsal lobe is broadly truncate while ventral lobe is tab-like, dorso-ventrally compressed and slightly up-turned. Supra-phallic plate is rhomboid and sagittally folded approximately 45 degrees. Phallus with central tube slightly enlarged apically; parameres unforked, each with apical one-half sclerotized and slightly curved (Fig. 3A).

Female. Body length 5.5 - 6.5 mm. Forewing length 6.5 - 8.0 mm. Color pattern similar to male. Abdominal sternite 7 produced posterad approximately 1/4th of its length. The apical end broadly rounded across most of its width with a slight mesal notch (Fig. 1B). The internal spermathecal sclerite, weakly sclerotized and gradually narrowing posteriorly forming a "teardrop" shape (Fig. 4A).

Types. Holotype male and paratype female from Nebraska: Hall Co., Platte River intermittent slough on Mormon Island, 01-X-1997, M. Whiles (INHS). Additional paratypes (all same locality): 01-X-1997, M. Whiles, 2 males (NMNH); 30-IX-1997, M. Whiles and B. Goldowitz, 5 males, 4 females (KSU); 01-X-1997, M. Whiles, 1 male (KDA); reared from pupae in X-1997 by KDA and MRW, 04-VI-1997, M. Whiles, 5 males, 1 female (KDA). 30-IX-1997, M. Whiles and B. Goldowitz, 3 males, 3 females sacrificed for scanning electron microscopy.

Etymology. The species is named after the landscape of the Great Plains and the Platte River from which it was collected.

Diagnosis. The smaller size of this species easily separates it from the much larger Nearctic species (Schmid, 1955): *I. punctatissima*, *Ironoquia kaskaskia* (Ross, 1944) and *Ironoquia lyrata* (Ross, 1938) which have forewing lengths > 14 mm. It is most similar in size to, but distinctly smaller than *I. parvula*. Based on very similar genitalic structures, it is most closely related to *I. parvula*. However, *I. plattensis* is most easily separated from *I. parvula* based on the presence of unforked parameres (Fig. 3A) as opposed to bifurcate parameres in *I. parvula* (Figs 3B). A small, subapical fork may occasionally be present on only one of the parameres of *I. plattensis*, however, it is never apical. In addition, this new species possesses shorter and more blunt inferior appendages (Fig. 3C,E) than *I. parvula* (Fig. 3D,F), the upper cercal lobes are more apically acute in *I. plattensis* (Fig. 3G) than in *I. parvula* (Fig. 3H), and the lateral wings of the supra-phallic plate are also longer with the tips more recurved in *I. plattensis*. *Ironoquia plattensis* females possess a gradually narrowing "teardrop" shaped spermathecal sclerite (Fig. 4A) whereas the spermathecal sclerite of *I. parvula* females narrows abruptly and forms a "key-hole" shape (Fig. 4B). The coloration of *I. plattensis* is lighter and the spotting on the wings is much more pronounced than in *I. parvula*.

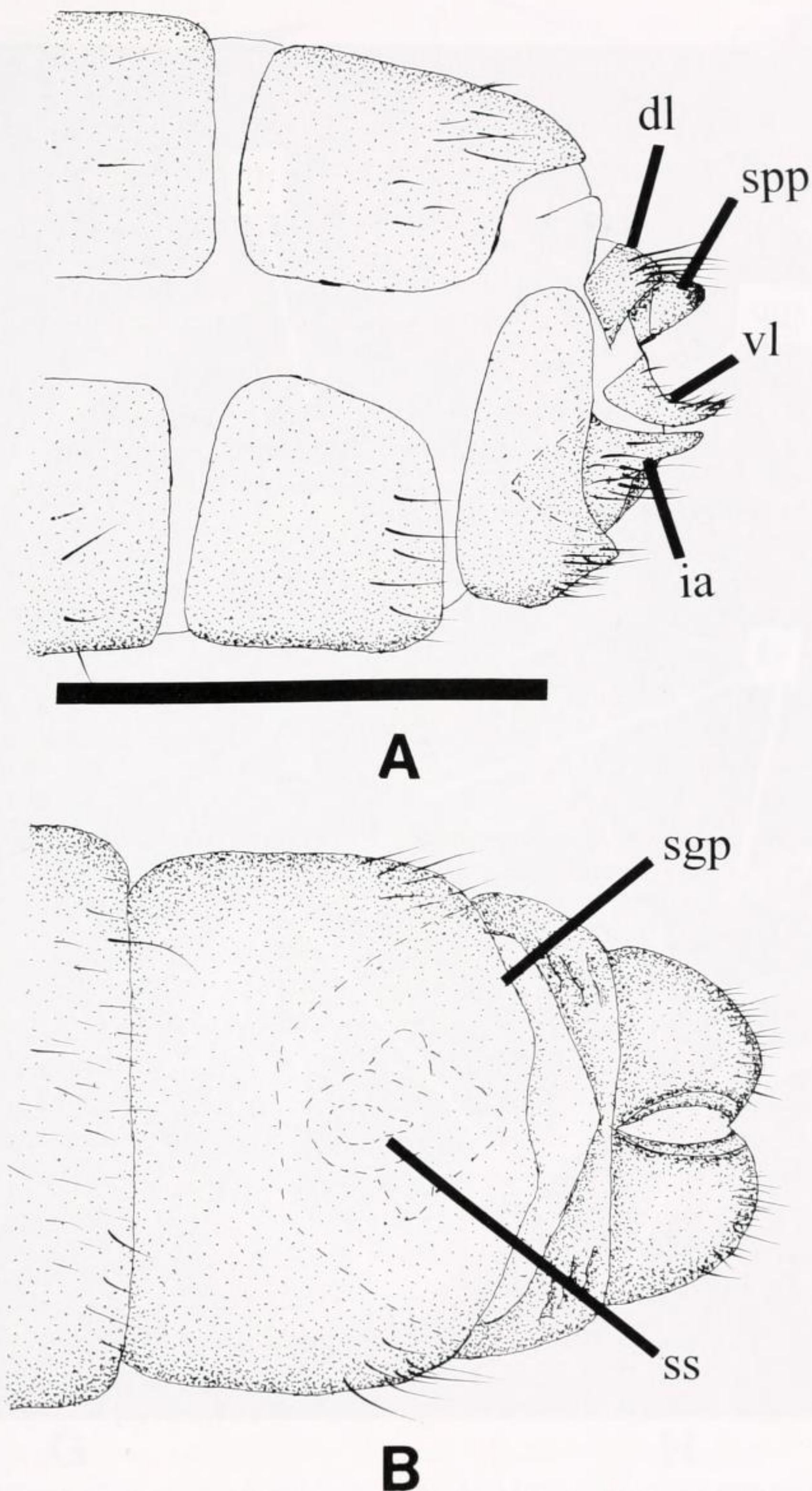


Figure 1. Illustrations of *Ironoquia plattensis* male and female genitalia (scale bar = 0.5mm). A. Male, lateral view (dl = dorsal lobe of cercus, ia = inferior appendage, spp = supra-phallic plate, vl = ventral lobe of cercus). B. Female, ventral view (sgp = subgenital plate, ss = spermathecal sclerite).

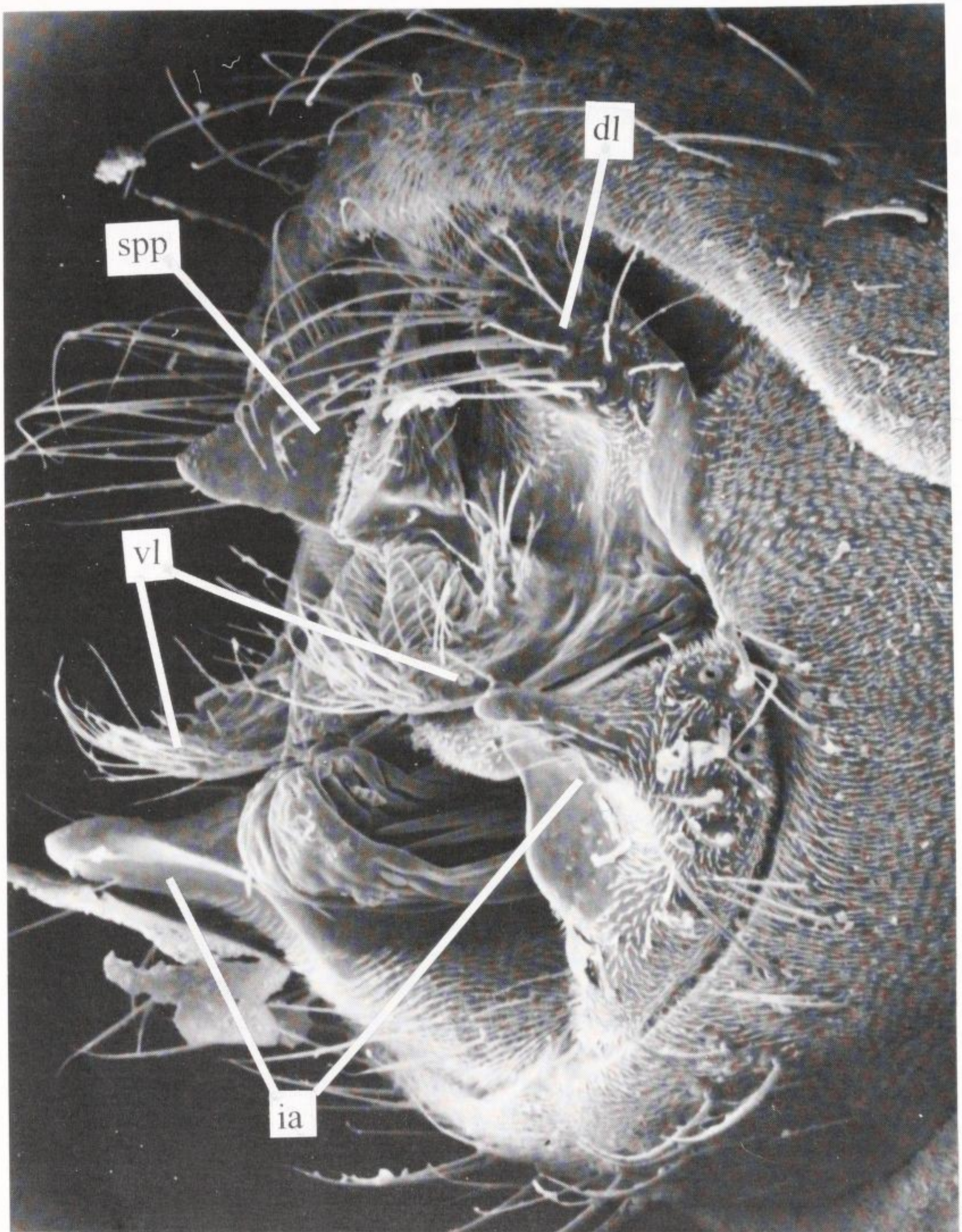


Figure 2. Scanning electron micrograph of *Ironoquia plattensis* male genitalia; postero-lateral view (dl = dorsal lobe of cercus, ia = inferior appendage, spp = supra-phallic plate, vl = ventral lobe of cercus).

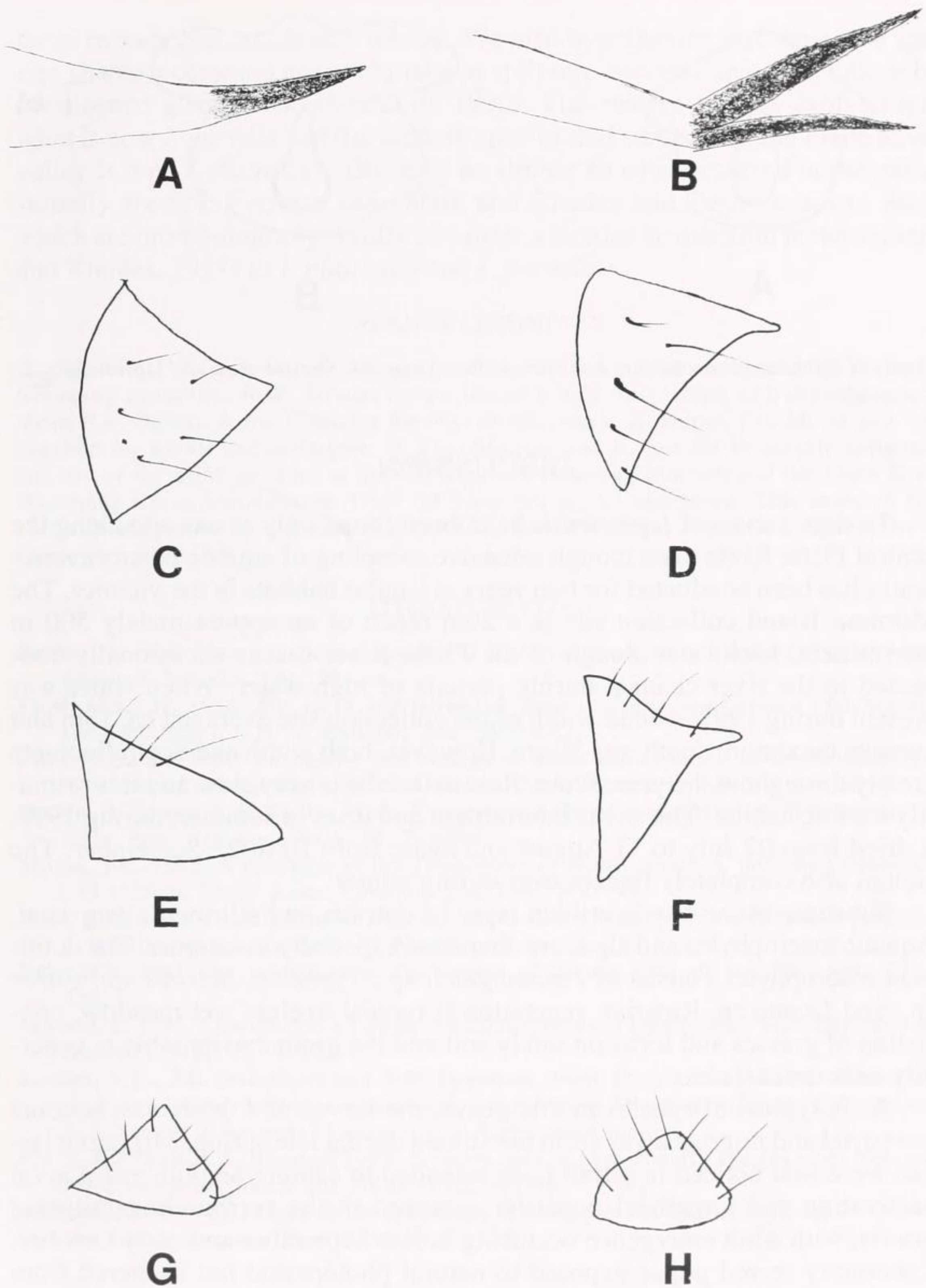


Figure 3. Diagnostic male genital structures for *Ironoquia plattensis* and *Ironoquia parvula*. A. *I. plattensis* paramere. B. *I. parvula* paramere. C. *I. plattensis* inferior appendage, lateral view. D. *I. parvula* inferior appendage, lateral view. E. *I. plattensis* inferior appendage, dorsal view. F. *I. parvula* inferior appendage, dorsal view. G. *I. plattensis*, upper cercal lobe, dorsal view. H. *I. parvula* upper cercal lobe, dorsal view.

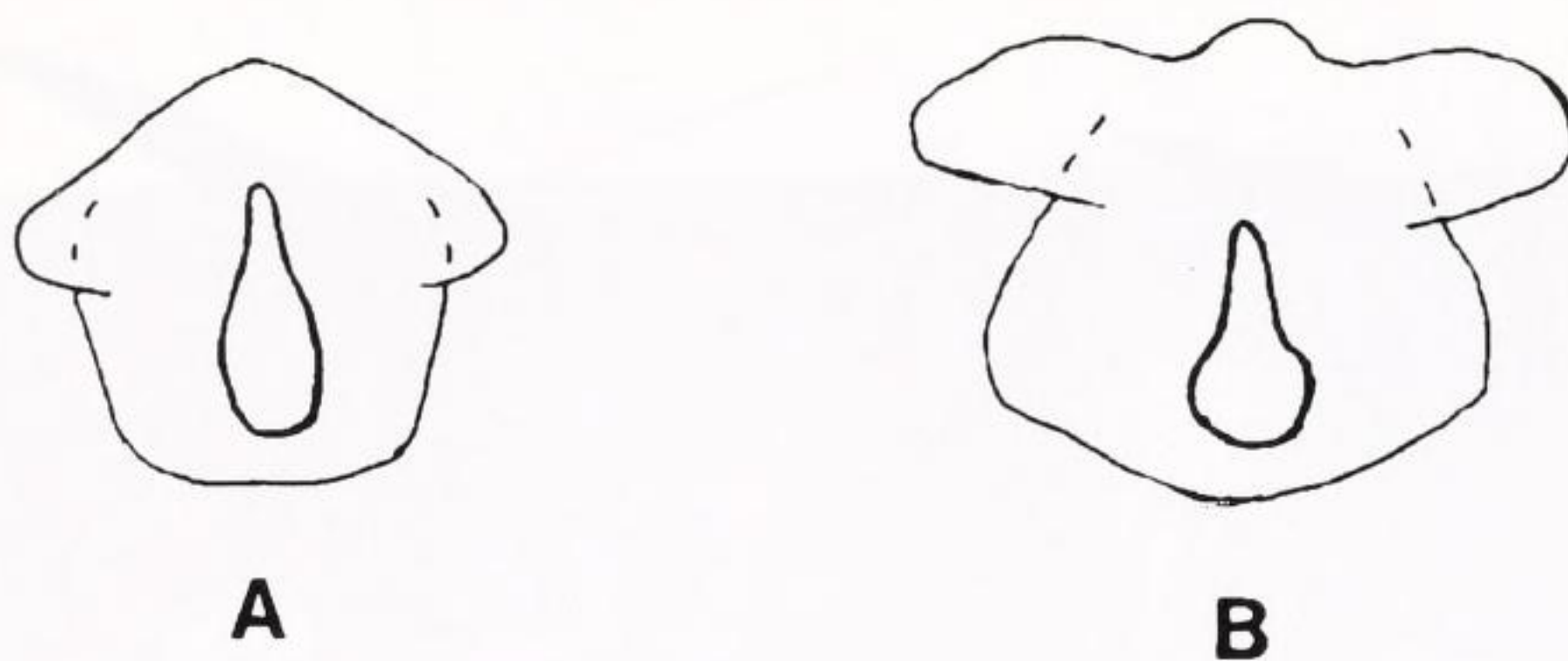


Figure 4. Female spermathecum and spermathecal sclerite, ventral view. A. *I. plattensis*. B. *I. parvula*

DISCUSSION

To date, larvae of *I. plattensis* have been found only at one site along the central Platte River even though intensive sampling of aquatic macroinvertebrates has been conducted for two years at similar habitats in the vicinity. The Mormon Island collection site is a 20m reach of an approximately 500 m intermittent, backwater slough of the Platte River that is occasionally connected to the river channel during periods of high water. When water was present during 1997, wetted width of the collection site averaged ca. 13m and average maximum depth was 30 cm. However, both width and depth fluctuate greatly throughout the year. Water flow at the site is very slow and it is primarily a lentic habitat. The site is intermittent and dries in summer; during 1997, it dried from 02 July to 11 August and again from 10 to 22 September. The slough also completely freezes over during winter.

Substrate at the site is a thick layer of detritus and silt overlaying sand. Aquatic macrophytes and algae are abundant, especially in summer. The dominant macrophytes consist of *Potamogeton* sp., *Typha* sp, *Scirpus* sp., *Carex* sp., and *Lemna* sp. Riparian vegetation is typical treeless wet meadow, consisting of grasses and forbs on sandy soil and the groundwater table is generally near the surface.

As is typical of species in this genus, the larvae of *I. plattensis* become terrestrial and migrate away from the stream during late spring. Migrating larvae were first noticed in pitfall traps intended to capture amphibians. Larval aestivation and terrestrial pupation occurred in the surrounding tallgrass prairie, with adult emergence occurring in late September and early October. Laboratory reared pupae exposed to natural photoperiod but sheltered from extremes in temperature emerged at the same time as well.

Much of this biological information about *I. plattensis* is similar to what occurs in *I. parvula* (Flint 1958, 1960) which reinforces our hypothesis that

these two species are closely related. We also hypothesize that these two species shared a common ancestor that was split into two vicariant populations by Pleistocene glaciers (Souders et al. 1990). The eastern species evolved into what is now *I. parvula* and the western species that survived in the Platte River valley is now *I. plattensis*. This may be similar to what occurred in the perlid stonefly species, *Perlesta xube* Stark and Rhodes and *Perlesta adena* Stark which are morphologically similar and share a similar distribution pattern (Stark and Rhodes, 1997) to *I. plattensis* and *I. parvula*.

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