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Morphological variation in diagnostic features for two *Culex* (*Culex*) species of the Neotropical Region (Diptera: Culicidae)

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The classification of *Culex* L., with 768 species worldwide (Harbach 2015), is based mainly on adult anatomical characters (Harbach *et al.* 2012). The accurate identification of the 198 species included in the subgenus *Culex* is dependent on a few morphological characters, principally of the male genitalia (Harbach *et al.* 2012). Most species within *Culex* (*Culex*) have been described based on male genitalia due to their low intraspecific variability compared to characters of females and larvae. Male genitalia provide synapomorphic characters useful in establishing phylogenetic relationships in Culicidae (Reinert *et al.* 2008, Reidenbach *et al.* 2009, Harbach *et al.* 2012, Laurito & Almirón 2013), as well as autapomorphic traits allowing specific identifications.

Several *Culex* (*Culex*) species have been incriminated in the transmission of arboviruses in Argentina. *Culex bidens* Dyar was suspected to be the vector of Eastern Equine Encephalitis virus during the 1988 epizootic in Chaco Province (Sabattini *et al.* 1998), and *Cx. interfor* Dyar is considered to be a secondary vector of Saint Louis Equine Encephalitis virus (Spinsanti *et al.* 2009) in Córdoba Province. The sister species *Cx. bidens* and *Cx. interfor* (Laurito & Almirón 2013) share characters of the gonocoxopodite, including the subapical lobe and its ornamentation, paraproct shape and lack of the phallosome dorsal arm, but they can be distinguished by the following traits (Harbach *et al.* 1986): lateral plate of *Cx. bidens* with 1–3 (usually 2) large dorsolaterally directed teeth, 0–3 minute conical denticles and ventral arm as a spine bent dorsolaterally; *Cx. interfor* has a single strong tooth directed dorsolaterally in the lateral plate, infrequently with minute denticles, and the ventral arm is a small, triangular, laterally directed flap-like process.

Knowledge of mosquito species distributions is relevant for diversity studies, necessary for effective control programs, and useful in determining areas of potential risk of pathogen transmission, especially for species of public health concern. Mosquito specimens collected as part of an arbovirus and entomological surveillance project carried out in northern and central Argentina indicated that *Cx. bidens* and *Cx. interfor* can occupy the same habitat. Immature stages of both species were collected from temporary pools at ground level, with a 300-ml dipper, at the following locations: Córdoba (31°21'14.26''S–64°06'7.49''W), Córdoba Province; Chumal (30°20'45.4''S–66°19'33.4''W), La Rioja Province; La Puerta (28°11'1.7''S–65°48'40.7''W), Catamarca Province and Resistencia (27°27'10''S–58°58'08''W), Chaco Province. Identification of the sympatric specimens of both species was based on males. Morphological variants of diagnostic features of the genitalia are reported below.

All morphological variants are related to the number, breadth, and length of teeth of the lateral plate and most are asymmetrical. Specimen identification was based on the ventral arm, which remains invariant according to the description given by Harbach *et al.* (1986).

Morphological variants of *Cx. bidens* (ventral arm as a spine bent dorsolaterally, Fig. 1 A–E) include: (1) specimens with one side with one tooth, the other side with the typical two dorsolaterally directed teeth (two specimens, April 2015, Córdoba, Córdoba Province); (2) specimens with the external tooth of one side less developed, about 0.25× the length of the internal tooth (three specimens, December 1995 and April 1996, Resistencia, Chaco Province, Fig. 1A); (3) specimens with three teeth as follows: specimens having one side with three teeth equally developed (two specimens, April 2015, Córdoba, Córdoba Province, Fig. 1B) as is typical for the species, or three teeth on one side similar in length and shape except for the internal tooth, which is shorter and broader, and the other side with a single tooth (one specimen, April 2015, Córdoba, Córdoba Province, Fig. 1C); (4) specimens with one side having three teeth of differing size, medial tooth normal and internal and external ones about 0.30 and 0.25 times, respectively, the length of medial one (one specimen, April 1996, Resistencia, Chaco Province, Fig. 1D); and (5) specimens with three teeth on both sides, but teeth shorter and broader than normal for *Cx. bidens* (two specimens, November 2008, Puerto Iguazú, Misiones Province, Fig. 1E).