Culex (Culex) interfor Dyar (Diptera: Culicidae),
Morphological Description Including Previously Unknown Life Stages

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The adult female and male and the pupal and larval stages of Culex (Culex) interfor Dyar are described and compared with those of Cx. bidens Dyar. Available data about distribution are presented.

Key words: Culex interfor - Diptera - Culicidae

Culex (Culex) interfor was described by Dyar (1928). Bram (1967) synonymized Cx. interfor with Cx. bidens Dyar, 1922 based on superficial similarities in the male genitalia. Harbach et al. (1986) resurrected Cx. interfor from synonymy based on a careful study of male genitalia. The shape of the ventral arm and the dentition of the lateral plate of the phallosome are important features which distinguish these species.

During ecological studies carried out in Córdoba, Argentina, one of the authors (WR Almirón) collected and reared immature stages of Cx. interfor, obtaining adults associated with immature stages. These specimens enabled us to describe the adults and immature stages of this species. The larval and pupal stages were unknown until now.

TAXONOMIC TREATMENT

Culex (Culex) interfor Dyar

Culex (Culex) interfor Dyar, 1928: 372 (♂♀). Lectotype male: between Tucumán and Jujuy, Argentina (NMNH); Lane 1953: 346 (♂♀); Stone and Knight 1957:51 (lectotype desig.); Bram 1967: 35 (syn. with Cx. bidens Dyar); Harbach et al. 1986: 141 (G ♂♀; resurrected from syn.).

FEMALE. Head: proboscis dark-scaled, frequently with pale scaling on ventral surface from base to 0.75 length. Maxillary palpus entirely dark-scaled. Antennal pedicel without scales, yellowish, but light brown on medial portion; base of first flagellomere yellowish, remainder dark. Vertex mostly with narrow decumbent scales, these white posteriorly and on ocular line, light tanned anteriorly; a small patch of broad dingy white scales on postgena; forked scales light brown; occipital region with narrow white scales. Cibarial armature (Fig. 1D,E): cibarial bar concave, dorsal surface and posterior margin smooth; about 24-26 small, spatulate teeth, each tooth more expanded on distal part, apical margin smooth, truncate; hollow area absent. Thorax (Fig. 1C): integument yellowish, darker on postpronotum, scutum covered with very fine falcate scales, background scales mostly coppery with golden reflections, with some whitish scales on anterior promontory and supraalar and prescutellar areas. Scutal setae prominent, brown with golden or reddish reflections; acrostichal setae present. Scutellar scales white; lateral lobes each with 4-6 large setae, median lobe with 5-8 long setae. Antepronotum with scattered narrow dingy white scales and with brown setae over most of surface. Postpronotum with narrow brown scales along dorsal margin; posterolateral margin with dark setae. Proepimeron bare. Upper proepisternum with numerous setae and a patch of broad white scales. Lower mesokatepisternum with 1-5 setae and a patch of broad white scales; upper mesokatepisternum with a row of setae and a patch of broad white scales on upper corner. Mesepimeron with 1 lower seta, 4-6 upper setae and patches of broad white scales on anterior and upper portions. Paratergite without scales. Pleural integument yellowish, darker on postpronotum,
postspiracular area, subspiracular area and prealar
knob, a dark spot on mesokatepisternum between
the 2 patches of white scales, spot extends to the
anterior area of mesepimeron and onto upper
mesepimeron. Legs: dark-scaled, scales similar in
color to proboscis. Forecoxa with a small patch of
light scales dorsally, dark scales ventrally and an-
teriorly, mid- and hindcoxae with longitudinal
patches of colorless scales. Femora dark-scaled
except for usual pale scales and small patch of pale
scales at apex. Fore-, mid- and hindtibiae dark dor-
sally, pale ventrally. Foretarsus mostly dark-scaled
with indistinct patches of pale scales on base of
foretarsomeres 2-4, 5 dark; midtarsus similar to
foretarsus; hindtarsomere 1 dark dorsally, pale
ventrally, 2-5 with inconspicuous patches of pale
scales at base. Wing (Fig. 1A,B): scales dark brown,
sometimes with a few pale scales on basal portion
of costa, reaching humeral cross-vein. Abdomen:
tergum I with a median posterior patch of dark
scales; terga II-VII dark-scaled with basolateral
patches of white scales; tergum II, occasionally
with small median anterior patch of white scales;
terga III-VII sometimes with narrow anterior bands
of white scales; tergum VIII white-scaled anteri-
orly, dark posteriorly. Sterna white-scaled, occa-
sionally with a few scattered dark scales.

MALE. Like female except for the following sexual
differences. Head: antenna strongly verticilate. Maxillary palpus longer than proboscis;
entirely dark brown on dorsal surface, ventral
surface with patches of white scales on base of
palpomere 5, from apex to base of 4 and just be-
yond middle of 3; palpomeres 4 and 5 densely se-
tose along ventral surface, palpomere 3 with strong
setae on outer area just beyond middle. Abdomen:
tergum II entirely dark-scaled or with a median
anterior patch of white scales; terga III-VI dark-
scaled with narrow anterior bands of white scales
(remaining terga removed with genitalia). Sternum
II white-scaled; sternum III-VI variable, mostly
white-scaled or, sometimes, covered with light
brown scales and narrow anterior bands of white
scales and a few white scales posteriorly. Genita-
lia: consult Harbach et al. (1986).

PUPA (Fig. 2). Placement and character of setae
as figured; range and modal number of branches in Table I. Cephalothorax: lightly tanned, scutum,
postscutal area, dorsal portion of mesothoracic
wing, metanotum, metathoracic wing and legs
darker. Setae 1.4-CT usually triple; 2.5,8,12-CT
usually with 4 branches, 5,12-CT with 4,5
branches; 3,6,9,11-CT usually double, 6,11-CT
with 2,3 branches; 10-CT often with 6 branches
(6-13). Trumpet: moderately tanned, cylindrical;
index 4.41-7.15 (X = 5.82); tracheoid area darker,
extending about 0.46 from base. Abdomen: lightly
tanned, posterior median portion of tergum I darkly
pigmented, anterior margins of terga darker, par-
icularly on terga II-IV, surface of sternum I with
tiny spicules; length 2.05-2.51 mm (X = 2.35 mm).
Seta 6-1,II usually single; 7-1 always double, 7-II
most often double (2,3); 1-II with 16-21 branches;
1-III usually with 7 branches, 1-IV often with 6
branches, 1-V usually triple; 2-II lateral to seta 1,
2-III-VI mesal to 1, 2-VII variable in position, lat-
eral or mesal to 1; 5-IV usually triple (2-4), 5-V-
VII usually double; 6-III usually double (2,3), 6-
IV-VI normally double. Genital lobe: lightly tanned
in female, darker in male; length about 0.16 mm in
female, 0.25 mm in male. Paddle: lightly tanned,
outer margin with minute spicules from base to 0.6
length; midrib distinct except at apex; seta 2-P
present, about 0.5 length of 1-P.

LARVA (Fig. 3). Placement and character of setae
as figured; range and modal number of branches in Table II. Head: wider than long; length
and width not measured; lightly tanned, anterior
part of dorsal apotome slightly darker, posterior
part of dorsal apotome and posterior part of lateralia
with moderately tanned spots. Median labral plate
narrow but distinct. Labiogula narrower anteriorly
than posteriorly; hypostomal suture complete, ex-
tended posterolaterally from posterior tentorial pit
to near collar. Collar moderately developed along
lateralia, heavily tanned. Dorsomentum with 7-10
teeth on either side of median tooth. Seta 1-C slen-
der, lightly tanned; 2-C absent; 3-C distinct; 4-C
slender, single; 5,6-C strongly developed, 5-C with
2-4 branches, 6-C usually triple (2,3); 7-C re-
sembles 5,6-C, with 5-10 branches; 8-C with 3-5
branches; 9-C with 3-9 branches; 10-C with 3-5
branches; 11-C usually triple; 12-C usually with 5
branches; 13-C usually with 4 branches; 14-C most
often single (1-3); 15-C with 3-8 branches; 16,17-
C absent. Antenna: length 0.45-0.51 mm (X =
0.48 mm), lightly tanned, mesal surface with dark
spot at base, portion distal to seta 1-A darker, or
evenly and moderately tanned with a dark spot at
base of mesal surface; seta 1-A 0.29-0.36 from
base; antennal flagellum proximal to seta 1-A, acicu-
late, distal part thinner and with a few aciculae
laterally near seta 1-A. Seta 1-A large, with 22-30
aciculae branches. Thorax: integument hyaline,
covered with tiny spicules; tubercles of all large
setae moderately tanned; tubercles of setae 9-12
without spine on prothorax, but with moderately
large spines on meso- and metathorax. Setae 1-3-
P single, nearly of equal length; 4-P normally
double; 7,8-P usually double (2,3), 7-P with 2,3
branches, 8-P with 1-3 branches; 11-P with 5-9
branches. Seta 1-M usually single (1-3), shorter
Fig. 1: *Culex (Cux.) interfor*, female. A,B: dorsal surface of right wing; C: lateral aspect of thorax; D,E: cibarial armature.
than 3-M; 3-M normally single; 4-M always double. Seta 1-T short, less than 0.5 of 2-T, with 2-4 branches; 2-T with 2,3 branches. **Abdomen:** integument hyaline, spiculation finer than on thorax, more evident on segment VIII; tubercles of setae 6-I-VI, 7-I and 1,3-VIII moderately tanned.

Fig. 2: *Culex (Cux.) interfor*, pupa. CT: cephalothorax; GL: genital lobe; Pa: paddle; T: trumpet; I-IX: abdominal segments. Scales in mm.
### TABLE I

Number of branches for setae of the pupa of *Culex(Cux.)interfor*

<table>
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<th>Seta</th>
<th>Cephalothorax</th>
<th>Abdominal segments</th>
<th>Paddle</th>
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*a*: based on counts made on 5 to 10 setae;  
*b*: range (mode, when distinct).

Seta 3-I-VII most often single, 3-I,III,IV,V,VI occasionally double; 6-I-VI long, 6-II triple or with 4 branches, 6-III-VI normally double; 7-I similar to 6-I, usually double (1-3); 1-I with 3-8 branches, 1-IV,VI double or triple, 1-III usually triple, 1-V,VI triple or with 4 branches. **Segment VIII**: comb with 24-44 scales; scales short, normally fringed on sides and apex, apical fringe more distinct; arranged in 4 irregular rows. Seta 1-VIII with 3-8 branches; 3-VIII with 6-10 branches; 5-VIII with 2-6 branches. **Siphon**: index 3.62-5.26 (X = 4.49); moderately tanned, strongly tanned on acus, base, spiracular apparatus, spiraculpal apodeme and apex; meanspiracular apodeme ratio [length of spiracular apodeme divided by dorsal length of siphon (Strickman & Pratt 1989)] 0.24. Pecten on basal 0.30 of siphon, with 12-15 spines; larger spines with 2-4 basal denticles. Seta 1-S in 3 pairs, 1-S inserted near most distal pecten spine, 1b-S out of line with the others, arising about 0.7 from 1-S. **Segment X**: saddle complete, moderately tanned, slightly darker dorsally, with distinct spicules on lateral area of posterior end; length 0.35-0.37 mm (X = 0.36mm), siphon/saddle index 3.42-4.14 (X = 3.82). Seta 1-X single or double; 2-X double or triple; 4-X usually in 5 pairs. Anal papillae long and slender, gradually tapering to blunt tip, dorsal pair about 1.8 length of saddle, ventral pair about 1.5 length of saddle.

**MATERIAL EXAMINED.** *Cx. interfor*: 8♂, 13♀, 17♂G, 16 Pe, 18 Le, as follows: ARGENTINA, Córdoba State, Ruta 36 y Río Segundo, 3 Mar. 1988, Almirón and Brewer coll. 2♀1♂ 3Pe 3Le 3♂G; 8 Mar. 1989, 2♂ 2♂ 4Pe 4Le 2♂G; Alta Gracia, Puesto La Soledad, 26 Jan. 1988, Almirón coll. 1♀ 1♂ 1Le 1♂G; Puesto de Gonzáles, 3 Feb. 1987, Almirón and Brewer coll. 1♀ 1♂ 1Le; Colonia Caroya, 13 Feb. 1988, Almirón and Brewer coll. 1♀ 1♂ 2Le 2♂G; Campo Grande, 6 Dec. 1987, Almirón coll., 5♂ 4♂ 7Pe 7Le 9♂G; Valle del Rosario, 29 Jan. 1987, Brewer coll., 1♀. *Cx. bidens*: 5 Pe, 5 Le with associated males and females, as follows: BRAZIL, São Paulo State, Cesário Lange County, SP 141 Road, km 43, Aleluia District, 19 Mar. 1990, Sucen coll.

**DISTRIBUTION.** *Cx. interfor* is known from the states of Chaco, Corrientes, Santa Fé, Tucumán and Córdoba in Argentina. Lane’s (1953) record for *Cx. interfor* from Bolivia cannot be confirmed since the male genitalia of his specimen are poorly mounted and the genitalic structures are damaged.

**SYSTEMATICS.** *Cx. interfor* and *Cx. bidens* are similar species which can be easily separated by the male genitalia and some characters of the larva and pupa. According to Harbach et al. (1986), *Cx. interfor* mainly differs from *Cx. bidens* by having the lateral plate of phallosome with a single strong apical tooth, infrequently with 1 or 2 minute denticles and the ventral arm is uniquely developed as a small triangular flaplike process, directed laterally. In contrast, *Cx. bidens* has the lateral plate with 1-3 large...
Fig. 3: Culex (Cux.) interfor, larva. A: antenna; C: cranium; CS: comb scale; M: mesothorax; P: prothorax; PS: pecten spine; S: siphon; T: metathorax; I-X: abdominal segments. Scales in mm.
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*a: based on the counts made on 5 to 10 setae; b: range (mode, when distinct).*
dorsolaterally directed teeth, 0-3 minute conical denticles and the ventral arm is strongly developed as a spine dorsolaterally bent.

In the larval stage, *Cx. interfor* differs from *Cx. bidens* in having seta 4-II with 8-11 branches, 7-IV with 12-14 branches, 1-V triple or with 4 branches, 7-V with 8-14 branches. *Cx. bidens* has seta 4-II with 4-9 branches, 7-IV with 7-9 branches, 1-V normally double and 7-V with 6-9 branches. The position of seta 1a,b-S of siphon and the number of scales of the comb scales may be useful to separate these species. *Cx. interfor* has 24-44 comb scales and seta 1b-S arises about 0.7 from 1a-S. *Cx. bidens* has 46-52 comb scales and seta 1b-S arises about 0.5 from 1a-S.

In the pupal stage *Cx. interfor* can be easily differentiated from *Cx. bidens* by having setae 4-II with 16-21 branches, 5-III with 6,7 branches, 7-V with 6-9 branches, 4-VI with 4,5 branches and 6-VII with 6-11 branches. The character of the trumpet can be used to distinguish these species. In *Cx. interfor* the trumpet is moderately tanned and the mean trumpet index 5.82. In *Cx. bidens* the trumpet is darker than in *Cx. interfor* and the mean trumpet index 7.41.

*Cx. interfor* can be distinguished from the other species of the subgenus *Culex* in the New World by adding the following modification to the key constructed by Bram (1967). The terms used by Bram for some morphological features have been changed to agree with Harbach and Knight (1980):

21.(20) Setae 4-II, 7-IV, 1-V, 7-V with 8-11,12-14, 3-4, 8-14 branches, respectively; comb with 24-44 scales, siphon with seta 1b-S arising about 0.7 from 1a-S... *interfor*

Setae 4-II, 7-IV, 1-V 7-V with 4-9, 7-9, 2, 6-9 branches, respectively; comb with 46-56 scales; siphon with seta 1b-S arising about 0.5 from 1a-S... *bidens*

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