

PERICEROS (HYMENOPTERA: ICHNEUMONIDAE) IN
MEXICO, WITH COMMENTS ON INSECT DISTRIBUTION
IN THE NORTHERN NEOTROPICS¹

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ABSTRACT

Xorides (*Periceros*), previously known from Perú, Brasil, and Argentina, now is reported for northeast México. *X. (Periceros) cerbonei* n. sp. is described from Cola de Caballo near Monterrey, and a key is given to all Neotropic *Xorides*. Besides *Periceros*, many other insects traditionally believed restricted to tropical wet forests actually reach northern México. Zoogeographic implications of this distributional pattern are discussed.

The cosmopolitan genus *Xorides*, which parasitizes wood-boring coleopterous larvae, is well represented in most zoogeographic regions, including, for example, 21 Nearctic species, but seems to have a meagre although widely distributed and in part trenchantly distinctive Neotropic fauna. Townes (1960:497) gives 1 Mexican record for the basically Nearctic *X. (Exomus) humeralis* (Say), but no other *Xorides* heretofore have been cited from Middle America. Porter (1975:51-6) reviewed the South American species, citing *X. xanthisma* Porter and *X. euthrix* Porter from northeast Argentina, *X. plumicornis* (Smith) from Amazonian Brasil and Perú, and *X. magnificus* (Mocşary) from southern Brasil and adjoining Argentina. *Xanthisma* is an aberrant member of the otherwise mostly Holarctic subgenus *Xorides* Latreille, while *euthrix* and *plumicornis* belong to the specialized and endemically Neotropic *Periceros* Schultz, and *magnificus* is the sole representative of the South American subgenus *Pyramirhyssa* Mocşary.

In June 1976, during fieldwork supported by United States National Science Foundation Grant DEB-75-22426, I collected 3 males of an undescribed *Periceros* at Cola de Caballo in Nuevo León State of northeastern Mexico. These records not only constitute a dramatic range extension for the subgenus but are equally surprising because the South American *Periceros* inhabit subtropical and tropical wet forests, while the Mexican species was taken at the northern extreme of the Neotropics where the climate is humid but practically warm-temperate and the flora resembles that of the southeastern United States.

Herewith, I describe the new Mexican *Periceros* and adduce some examples of other distributionally similar insect taxa.

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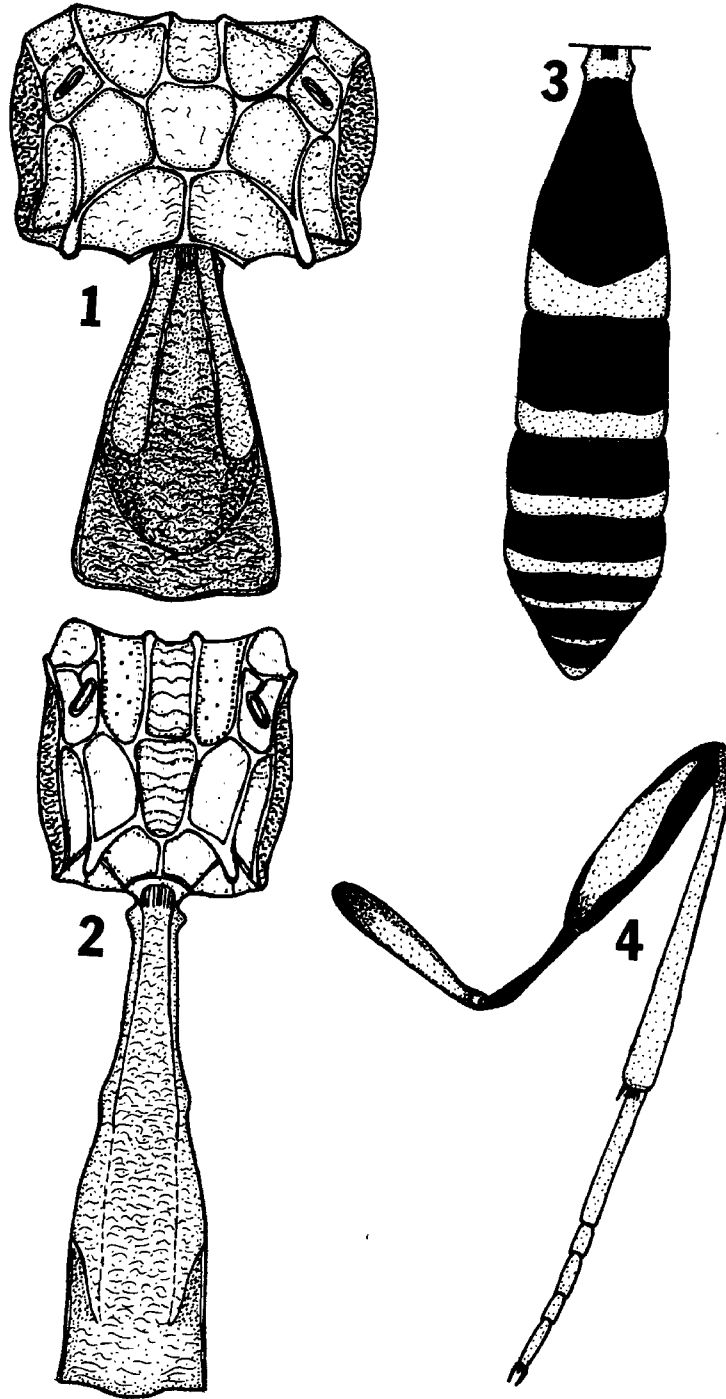
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TENTATIVE KEY TO NEOTROPIC *Xorides*

(Female of *cerbonei* and males of *magnificus* and *plumicornis* unknown).

1. Front trochantellus with a sharp apical tooth on front side; central lobe of mesoscutum with a broad median longitudinal groove..... *X. humeralis* (Say)
- 1'. Front trochantellus without a tooth; central lobe of mesoscutum without a median longitudinal groove 2
2. Propodeum transversely wrinkled but not areolated, with strong lateral subapical tubercles and the apical rim produced into a strong tooth behind each tubercle; tip of female flagellum gently curved *X. magnificus* (Mocsáry)
- 2'. Propodeum completely areolated and without subapical tubercles, although often with a tooth at apex of 2nd lateral area; tip of female flagellum abruptly elbowed 3
3. Hind trochantellus in front view 2.3 as long as trochanter; basal 1/2 of female flagellum with small appressed hairs; 2nd lateral area of propodeum with a weak tooth at apex; lower metapleuron finely puncto-rugulose; no baso-lateral expansion on 1st tergite *X. xanthisma* Porter
- 3'. Hind trochantellus in front view 2.5-3.0 as long as trochanter; basal 1/2 of female flagellum with long, dense, more or less erect and shaggy hairs; 2nd lateral area with a large tooth at apex; lower metapleuron coarsely wrinkled; 1st tergite with a triangular or rounded baso-lateral expansion 4
4. Gaster with broad yellowish-white apical bands on tergites 1-8; hind orbit broadly white; hind coxa and femur marked with black and white; mesopleuron becoming very sparsely punctate centrad *X. cerbonei* n. sp.
- 4'. Gaster uniformly dull red or orange; no white on hind orbit; hind coxa and femur uniformly red or orange; mesopleuron with abundant and almost uniformly distributed small punctures 5
5. Epomia strongly oblique; mesopleural punctures separated by less than 2X their diameters; setae of female 1st flagellomere long and coarse, only a little finer than those of following segments; temple, sides of pronotum, mesopleuron and lower metapleuron covered with very dense, long, silvery hairs that obscure the surface; head and mesosoma black with

Fig. 1-4. *Xorides* (*Periceros*) spp. Fig. 1. *Xorides* (*Periceros*) *cerbonei*, male Holotype. Dorsal view of propodeum and 1st gastric segment. Fig. 2. *Xorides* (*Periceros*) *euthrix*, male, Gobernador Virasoro, Corrientes, Argentina. Dorsal view of propodeum and 1st gastric segment. Fig. 3. *Xorides* (*Periceros*) *cerbonei*, male Holotype. Dorsal view of gaster, showing color pattern. Fig. 4. *Xorides* (*Periceros*) *cerbonei*, male Holotype. Lateral view of hind leg, showing color pattern.



- reddish on thoracic sterna and below on pleura.....
 *X. plumicornis* (Smith).
 5'. Epomia almost vertical; mesopleural punctures separated
 generally by more than 2X their diameters; setae of female 1st
 flagellomere relatively fine and short in comparison to those
 of succeeding segments; temple, sides of pronotum, meso-
 pleuron and lower metapleuron with long but only moder-
 ately dense, silvery pubescence that does not obscure the sur-
 face; head and mesosoma dull reddish with black staining, es-
 pecially on front, top of head, and thoracic dorsum.....
 *X. euthrix* Porter.

Xorides (Periceros) cerbonei Porter, NEW SPECIES
 (Fig. 1, 3, 4)

FEMALE: Unknown.

MALE: *Color*: antenna black with a white annulus on flagellomeres 9-13; palpi white with dusky on last 2 labial palpomeres and less strongly on last maxillary palpomere; head with black on mandible, sometimes briefly on dorso-lateral corner of clypeus, on lower 1/2 of malar space, on a contiguous band extending on and along hypostomal carina to juncture with occipital carina, on a narrow line reaching lower margin of eye in upper malar space, on a rather broad median vertical area below inter-antennal lamella, on much of front and vertex, on most of occiput, on upper 1/2-2/3 of hind part of temple, and on most of postocciput, as well as with white on most of clypeus, on most of face, on broad frontal and vertical orbits to level of hind ocelli, on very broad hind orbits which become progressively wider below and on most of lower 1/3-1/2 of temple extending rearward to occipital carina, and on about lower 1/4 of post-occiput; mesosoma black with white on axillary sclerites and dull white on mesepimeron, especially dorsad, on apex of lower metapleuron, and on propodeal cristae as well as with conspicuous areas of very long and dense, silvery pubescence on pronotum laterally, on broad lateral margins of scutellum, extensively dorsad, ventrad, and apicad on mesopleuron, and on lower metapleuron; gastric tergites black with yellowish white on about basal 1/9 and much of apical 1/4 of 1st, with broad yellowish-white apical bands on 2-7, and brownish on 8, claspers varying from dull yellow to brownish, and gastric sternites largely dull yellow to brownish yellow; fore leg with coxa, trochanter and trochantellus pale yellow with brownish, especially above, on apex of trochantellus; femur yellow with fulvous staining dorsally, except near apex, and with a little brown on base; tibia yellowish with an irregular brownish annulus, almost fading out below, at basal 1/3; and tarsus with 1st segment rather dull yellow to dusky brown and segments 2-5 progressively darker brown; mid leg similar to fore leg except with brown a little better developed on base of femur and sub-basally on tibia; and hind leg with coxa black basally and yellow apicad, the yellow reaching far basad anteriorly and dorso-posteriorly and the black extending far apicad medio-dorsally and, especially, posteriorly and ventrally where it reaches apex, as well as with apical rim more or less narrowly black; trochanter and trochantellus black; femur black with a broad, almost percurrent yellow blotch on anterior face; tibia yellow with some brownish on basal 1/6 and slightly on apex; and tarsus

yellow with brown on claws and briefly on apex of 5th segment; wings hyaline with a faint yellowish tint, dark brown venation, a dull yellow tinge medially and again near base on stigma, and briefly white on base of both fore and hind costal veins.

Length of fore wing: 6.9-8.0 mm. *Labial palpus:* last segment subglobular. *Head:* interantennal lamella high and strong, its anterior edge grooved; front smooth and shining with scattered punctures and wrinkling; vertex and occiput with small, sparse punctures; ocellar area a little raised, set off by a shallow impression anteriorly and laterally and with a short groove reaching rearward from median ocellus; temple with sparse, tiny punctures and long, pale setae which become moderately denser ventrad. *Pronotum:* epomia vertical; laterally behind epomia with abundant, fine setiferous punctures. *Mesoscutum:* shining and more or less extensively smooth, central lobe laterad with some coarse to very coarse transverse wrinkles, anteriad with increasingly dense fine punctures, and mesad with variably sparser medium-sized to large punctures and sometimes wrinkled, lateral lobes peripherally with rather dense medium-sized to large punctures and meso-apicad also with some coarse, variably developed wrinkling. *Mesopleuron:* discally polished and almost impunctate but peripherally with increasingly numerous small, setiferous punctures. *Hind coxa:* stout, convex in dorsal outline, 2.8-3.5 as long as wide at widest point. *Hind trochantellus:* in front view 2.7-3.0 as long as its trochanter. *First hind tarsomere:* 0.91-0.95 as long as tarsomeres 2-5 combined. *Propodeum:* completely areolated; 2nd lateral area at apex with a large, ligulate tooth; area-basalis 1.0-1.3 as long as wide at base, both it and areola smooth and shining with some irregular wrinkling. *First gastric tergite:* rather stout and strongly expanded apicad, postpetiole 1.2-1.5 as long as wide at apex; petiole with a prominent subtriangular or rounded basolateral expansion; postpetiole with very coarse reticulate wrinkling; dorsal carinae more or less well defined on basal 1/2 of postpetiole; dorso-lateral carina traceable and often strong throughout. *Second gastric tergite:* 0.75-0.85 as long as wide at apex; setae sparse on disc; shining, on basal 2/3 with considerable coarse wrinkling and large, slurred punctures but on apical 1/3 smoother and more sparsely punctate; baso-lateral corner cut off by a deep oblique groove that reaches lateral margin of tergite about 1/3 the distance to apex and that turns meso-apicad as a broader but still strong impression that, with the basal grooves, delimits a broadly raised, ovoid median area on basal 2/3 of tergite and this median raised area itself subdivided into a pair of transversely rounded, anterio-lateral swellings and a smaller, medio-apical, triangular zone; apical 1/3 of tergite rather strongly and evenly swollen. *Third gastric tergite:* similar to 2nd but less strongly sculptured and contoured.

TYPE MATERIAL. Holotype male: MÉXICO, Nuevo León State, Cola de Caballo nr. El Cercado, 18-VI-1976, C. Porter. Paratypes: 2 males, MÉXICO, Nuevo León State, Cola de Caballo nr. El Cercado, 18-VI-1976, C. Porter. Holotype in Museo de Historia Natural de la Ciudad de México, México City. First paratype in Florida State Collection of Arthropods, Gainesville, and 2nd paratype in collection of Charles C. Porter at McAllen, Texas.

RELATIONSHIPS. *Cerbonei* shows affinity to both South American species of *Periceros*.

Comparison with *plumicornis* is tentative because we have no females of *cerbonei* and no males of *plumicornis*, but the characters already mentioned in the key probably hold true for both sexes. Furthermore, the oblique epomia, smooth and polished 1st gastric tergite, and very densely and uniformly setose temple and mesopleuron of *plumicornis* likewise should prove diagnostic with respect to *cerbonei*, in whose males at least the epomia is vertical, the 1st gastric tergite strongly wrinkled, the temple rather sparsely setose, and the mesopleuron becomes less densely setose centrad.

On the other hand, having examined 8 males of *euthrix*, I find, in addition to the key characters, numerous differences from *cerbonei* and these may be summarized as follows.

Last labial palpomere securiform; front with almost uniformly strong puncto-reticulation; anterior edge of interantennal lamella sharp and ungrooved; temple with setae throughout extensively overlapping; ocellar area not definitely discrete from rest of vertex, no longitudinal groove behind mid ocellus; vertex and occiput with numerous medium-sized punctures; pronotum laterally with numerous but well separated large punctures that emit long but only moderately overlapping white setae; scutellum with moderately dense setae; hind coxa almost parallel-sided and very elongate, 5.8 as long as wide at widest point; 1st hind tarsomere 1.2 as long as tarsomeres 2-5 combined; area-basalis of propodeum 2.2 as long as wide at base, it and areola with rather regular coarse transverse wrinkles; 1st gastric tergite long, slender, and only gently expanded apicad, postpetiole 2.0 as long as wide at apex and with moderately fine, trans-biased reticulate wrinkling; dorsal carinae not extending onto postpetiole; dorso-lateral carinae obsolete on petiole, becoming sharp apicad on postpetiole; 2nd gastric tergite 1.1 as long as wide at apex, its setae sparse but in part overlapping on disc, smooth and shining with numerous but sparse small punctures and a little restricted weak wrinkling, its sharp, oblique, basolateral grooves and fainter postero-transverse impression defining on basal 2/3 a moderately swollen, almost circular, and scarcely subdivided median area.

FIELD NOTES. All specimens were found in deep forest. Two were netted from herbaceous undergrowth, while the 3rd was collected from a recently dead tree trunk.

SPECIFIC NAME. For Mr. Anthony Cerbone of Fordham University in recognition of his assistance during my Mexican fieldwork.

BIOGEOGRAPHIC COMMENTS

Cola de Caballo, the type locality of *X. cerbonei*, is a deep ravine located about 40 km south of Monterrey at approximately 500 m altitude on the eastern slopes of the Sierra Madre Oriental. It has a permanent stream and, facing east to west, gets little direct sun. Further shade is provided by the thick forest that clothes its floor and sides. These factors create a humid micro-environment whose lush vegetation contrasts with the surrounding sparser woods and Thorn Scrub.

The Cola de Caballo flora has many northern genera, although numerous species are Mexican endemics. Conspicuous trees are *Acer*, *Carya*, *Juglans*, *Platanus*, *Pinus*, *Quercus*, and *Taxodium*. On the other hand, subtropi-

cal epiphytes grow on these temperate trees, including not only the familiar *Tillandsia usneoides* and other much bulkier "tank" bromeliads but also orchids, ferns, and Cactaceae.

Collecting since 1974 at Cola de Caballo and other sites in Nuevo León State has yielded a complex ichneumonid fauna in which 60% of the genera are Neotropical. Besides *Xorides* (*Periceros*), previously recorded only from South America, I have also obtained in Nuevo León *Zonopimpla*, *Ganodes*, *Rhinium*, *Toechorchus*, *Latosculum*, *Cestrus*, *Nonnus*, *Oedicephalus*, *Cryptojoppa*, *Joppocryptus*, *Microsage*, *Joppa*, *Eurydacus*, and *Diacantharius*, taxa for the most part hitherto unknown from north of Córdoba, 1400 km south in tropical México and all of which range far into South America. As for other Neotropical genera of the area, *Epirhyssa*, *Bicristella*, *Carinodes*, *Dilopharius*, and *Macrojoppa* reach only the southern fringe of the United States but attain Argentina on the south; whereas, *Acrotaphus*, *Grotea*, *Lyneon*, *Polycyrtus*, *Cryptanura*, *Messatoporus*, *Thyreodon*, *Metopius* (*Peltales*), *Trogomorpha*, and *Ambloplisus* have 1 or a few species widely distributed in temperate North America, particularly in the east, as well as a greater representation in the tropics of both Middle and South America. In addition to the foregoing ichneumonids, some other noteworthy "tropical" elements among the Nuevo León insect fauna are the euglossine bee genera *Eulaema* and *Euplusia* and the pseudostigmatid zygoteron genus *Mecistogaster*, whose nymphs develop in water that collects at the base of the leaves of epiphytic tank bromeliads.

It is thus apparent that many Neotropical insects occur far north (and south) of the tropical climates with which we instinctively associate them. For example, the average January temperature at Monterrey, México is 14.6° C, and Cola de Caballo suffers numerous winter frosts and some snow. Moreover, 40 Neotropical ichneumonid genera (23% of the total fauna) reach as far north as Maryland or New Jersey in the eastern United States, where they generally are represented by 1 or a few species endemic to the Temperate Deciduous Forest. Rainfall rather than temperature thus would appear to be the major limiting factor for much of the Neotropical entomofauna, and, indeed, the Thorn Scrub and Desert of Texas and northern México constitute a largely effective barrier to present-day interchange between the Mexican and southeast North American Neotropical faunas.

Furthermore, most Neotropical ichneumonid genera have vast geographic ranges. Fully 67% (116) extend, like *Periceros*, at least from México or Central America to Brasil. Ample distributions of this type have been noted for diverse groups of organisms. Raven and Axelrod (1975:427) referred to them in vertebrates and angiosperm plants. Hershkovitz (1972:240) documented them for Neotropical recent mammals and, therefore, rejected the traditional thesis that a substantial water gap separated South from Middle America during the later Mesozoic and all of the Tertiary until the Pliocene. Halffter (1976:40), mainly on the basis of scarabaeid beetles, also believed that "ideas are changing about the Central American Land Bridge and, therefore, with regard to the possibilities of Pre-Pliocene faunistic exchanges between North and South America".

Analysis of Neotropical ichneumonids in any marginal area, such as Nuevo León or even the southeastern United States, helps strengthen the above zoogeographic postulates. One is impressed by the immense distributions of so many Neotropical ichneumonid genera and by the uniformity of

the present-day Neotropic fauna in all regions from México to Argentina. This assemblage certainly does not appear to have evolved for scores of millions of years in strongly isolated South and North American tropical land masses. Indeed, there are only 4 (out of 174) endemic Neotropic ichneumonid genera in all the New World north of South America. The evolutionary center for the Neotropic ichneumonid fauna was and is South America. The assemblage probably originated there during the Cretaceous and early Tertiary and then, essentially as a unit, rapidly overspread almost the whole New World in moist, warm Palaeocene and Eocene times, only to be pushed gradually out of North America by post-Eocene climatic cooling and drying and finally decimated there by the Pleistocene glaciations. It is not and never has been a "really tropical" fauna but rather a humid-adapted forest element capable of surviving moderate and regular winter frost but not the really harsh cold and invernally frozen soil of genuinely boreal climates.

It is thus easy to see why *Periceros* should occur both in the subtropical forests of northeast Argentina and the mountains of north México. At various times in the Tertiary such taxa could and did cross land bridges between South and Middle America. Since *Xorides* is best represented at present in the Oriental Region, we may suggest for it a Palaeotropic origin with various invasions of the New World via the Bering Land Bridge. The highly differentiated, warm-adapted, and endemically Neotropic *Periceros* and *Pyramirhyssa* probably are descendants of early, perhaps Palaeocene or Eocene invaders, while the mostly Holarctic and more eurythermic *Xorides* may have reached South America later in the Tertiary during a cooler climatic epoch.

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