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A NEW SPECIES OF *TRICHOGRAMMA* FROM URUGUAY (HYMENOPTERA: TRICHOGRAMMATIDAE)

Cesar Basso[1] and Bernard Pintureau[2]

ABSTRACT

A new species of *Trichogramma* is described from Uruguay, *T. bellaunionensis*, where it parasitizes *Diatraea saccharalis*. This species is the only American representative of the *kalkae* group which was up to now only known from Africa by two species.
Key words: *Diatraea*, egg parasitoid, new species, *Trichogramma*, Uruguay.

RESUMEN

Una nueva especie de Trichogramma es descripta para Uruguay, *T. bellaunionensis*, parasitando *Diatraea saccharalis*. Es la única integrante del grupo *kalkae* en el continente americano. Hasta el momento, este grupo solo era conocido de Africa por dos especies.
Palabras clave: *Diatraea*, parasitoide de huevos, nueva especie, *Trichogramma*, Uruguay.

INTRODUCTION

The genus *Trichogramma* Westwood includes numerous species of minute wasps parasitizing insect eggs and especially Lepidoptera eggs. It occurs worldwide and is commonly used in biological control. Pinto & Stouthamer (1994) estimated the number of species to 145, and Pinto (1997) estimated this number to 160 (ca. 30 species in the Neotropical region). The genus is divided into three subgenera (nominate subgenus, *Trichogrammanza* Carver, and *Vanlisus* Pinto) and many groups of species. The *Trichogramma* species from the Neotropical and Nearctic regions belong to the nominate subgenus divided into 15 groups (Pintureau, 1993) and the *Vanlisus* subgenus divided into 2 groups (Pinto, 1998).

[1]Facultad de Agronomía, av. Garzón 780, 12900-Montevideo, Uruguay. E-mail: cbasso@adinet.com.uy

[2]Biologie Fonctionnelle, Insectes et Interactions-UMR INRA/INSA de Lyon, INSA Bâtiment 406, 69621-Villeurbanne-cedex, France.

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Few *Trichogramma* species are known from Uruguay. Silveira Guido & Ruffinelli (1956) listed only one, *T. minutum* Riley, and it is an unreliable determination. Basso & Morey (1991) and Basso & Grille (1994) listed 3 other species whose identity was confirmed by J.D. Pinto and R.A. Zucchi, *T. pretiosum* Riley, *T. galloi* Zucchi and *T. distinctum* Zucchi. Zucchi *et al.* (1996) and Zucchi & Monteiro (1997) mentioned only the first two species. Monje (1995) listed 5 species from Brazil and Uruguay but did not differentiate their origin.

New collections were made since 1991 in Uruguay to improve our knowledge of the genus and select strains usable in biological control against some local pests. Among that material, a new species was recognized and is described in the present paper.

MATERIAL AND METHODS

Studied parasitoids emerged from *Diatraea saccharalis* (Fabricius) (Lep.: Pyralidae) eggs collected on rice in the Bella Unión region (Departamento de Artigas in the northern west of Uruguay)

in February 1991. Most of the parasitized egg masses were infested by *T. galloi*, and one was infested by the new species. A strain of the latter species (strain 51) was established and reared on *Ephestia kuehniella* Zeller (Lep.: Pyralidae) at 25°C, 70% RH and L:D 16:8.

Individuals of the type series were mounted in Canada balsam on slides. The morphological terminology of Pinto (1992) was used for the species description. Several measurements of morphological characters in 19 males allowed the calculation of mean ratios (most of the female characters are of poor interest in systematics).

Abbreviations: MNHN, Museum d'Histoire Naturelle de Paris; NMNH, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

DESCRIPTION OF THE NEW SPECIES

TRICHOGRAMMA BELLAUNIONENSIS, sp.n.

Diagnosis: The species belongs to the *Trichogramma* subgenus (Pinto, 1998) and the *kalkae* group (Pintureau & Babault, 1988; Pintureau, 1993) up to now comprising only two African species, *T. kalkae* Schulten & Feijen and *T. pinneyi* Schulten & Feijen. This group is characterized by a dorsal lamina (DLA) with a wide base and a pointed apex. The new species shows morphological differences with *T. kalkae* and *T. pinneyi* which have shorter setae on male flagellum, a DLA with a small notch on lateral margin (absent in *T. bellaunionensis* sp.n.) and a DLA apex exceeding the volsellar digit (VS) apex in *T. bellaunionensis* sp.n. By its long setae on male flagellum, the new species is similar to some South American species such as *T. bruni* Nagaraja and *T. castrensis* Velasquez de Ríos & Terán, but male genitalia, especially the DLA, are different. The DLA shows a narrower base in *T. bruni*, and is longer and presents an obvious lateral notch in *T. castrensis*. The new species is also close to the Central and North American species *T. lasallei* Pinto, but its DLA always shows a pointed apex, vs. an apex "usually obscurely pointed" (Pinto, 1998), and presents no lateral notch, vs. two narrow notches at base (Pinto, 1998). Moreover, *T. lasallei* shows longer aedeagus and ovipositor (0.91 and 1.22 length of hind tibia, respectively), and shorter seta on male flagellum (the longest reaches 2.77 basal width of flagellum).

Description: Color similar in males and females: dusky black except slightly paler femurs, antennae and stripes on abdominal terga, and much paler tibiae, tarsi and forehead.

Male: Antenna (Fig. 1b) with relatively long setae, length of longest seta on flagellum = 3.36 ± 0.06 basal width of flagellum. Flagellum relatively long, 6.05 ± 0.10 as long as basal width, 0.91 ± 0.01 as long as hind tibia. Forewing (Fig.1a) 0.44 ± 0.03 as wide as long; longest fringe seta at posterolateral corner of wing 0.24 ± 0.02 as long as maximun wing width. Genital capsule (Fig. 1c) 0.37 ± 0.01 as wide as long. Base of DLA wide and without notch laterally, DLA apex pointed and not reaching VS apex. Intervolsellar process (IVP) triangular and moderately developed, its apex not reaching the DLA apex. VS apex a little closer to the DLA apex than to the paramere (PM) apex. Ventral ridge (VR) about as long as 0.27 distance between the base of genital capsule and the IVP apex. Entire aedeagus (Fig. 1d) 0.81 ± 0.02 as long as hind tibia (Fig. 1e). Aedeagus longer than apodemes (ratio = 1.29 ± 0.20).

Female: Genitalia (ovipositor) 1.32 as long as entire aedeagus and 1.05 as long as hind tibia.

Types and material examined: Holotype (one male), allotype (one female), 3 male paratypes and 3 female paratypes are deposited in the MNHN collection, 24 paratypes are deposited in NMNH (6 males and 6 females) and in the Montevideo Faculty of Agronomy (12 males). Three males of the same series, in a wrong condition after mounting, were examined.

Etymology: Named for Bella Unión, city of the northern west of Uruguay.

Hosts: The species is known only from eggs of *D. saccharalis* on rice.

Geographic distribution: Known only from Uruguay, Bella Unión region.

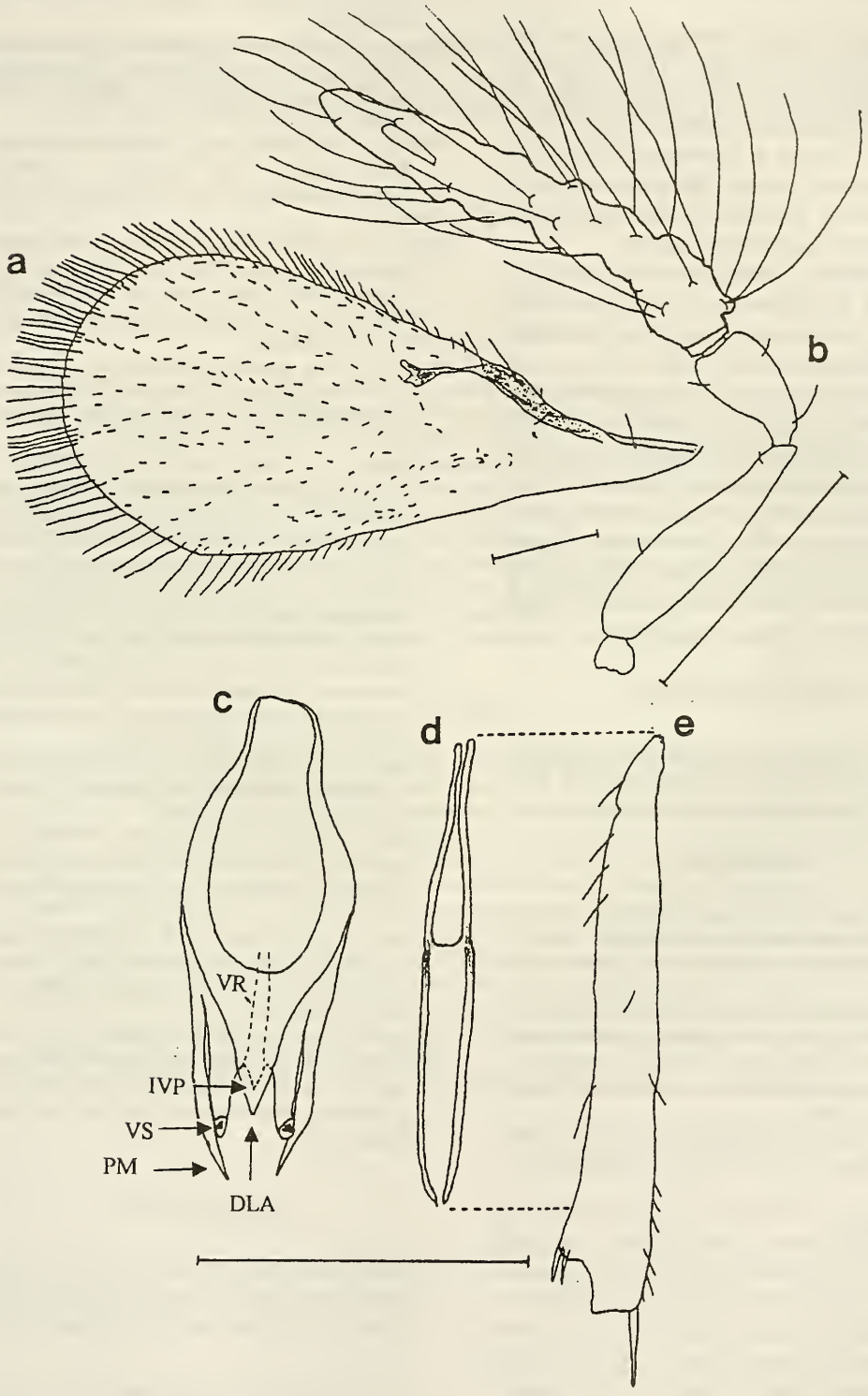

Figura 1: *T. bellaunionensis* sp.n. a, forewing. b, male antenna. c, male genitalia. d, entire aedeagus. e, hind tibia. Bars: 0.05 mm. "DLA: dorsal lamina, IVP: intervolsellar process, PM: paramere, VR: ventral ridge, VS: volsellar digit".

DISCUSSION AND CONCLUSION

The inventory of South American *Trichogramma* species is far to be closed. *Trichogramma bellaunionensis* is the first American species belonging to the *kalkae* group. This group, described by Voegelé & Pintureau (1982) from Africa, was scarcely studied. The determination of its phylogenetic position is thus premature (Pintureau, 1993, just listed the group).

The description of new species improves the knowledge of the biodiversity of egg parasitoids, and so is a key factor in the choice of the parasitoids usable in biological control. In fact, native species are generally more adapted to agrosystems than introduced species. In Uruguay, inundative releases of *Trichogramma* are still experimental. The native species *T. galloi* releases against *D. saccharalis* on sugarcane between 1988 and 1992 allowed a good control of the pest. The first attempt against Tortricidae moths of vine plants were carried out in 1996, but the most efficient *Trichogramma* species is still to be chosen (Basso *et al.*, 1999).

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REFERENCES

Basso, C. & G. Grille, 1994. Inventario preliminar de especies de *Trichogramma* presentes en el Uruguay. Proc. IV Simpósio de Controle biológico (Siconbiol), Gramado (Brasil): 234.

Basso, C., G. Grille & B. Pintureau, 1999. Eficacia de *Trichogramma exiguum* Pinto & Platner y *T. pretiosum* Riley en el control de *Argyrotaenia sphaleropa* (Meyrick) y *Bonagota cranaodes* (Meyrick) en la vid en el Uruguay. Agrociencia, *3*: 20-26.

Basso, C. & C. Morey, 1991. Biological control of the sugarcane borer *Diatraea saccharalis* Fabricius (Lepidoptera: Pyralidae) with *Trichogramma* sp. (Hymenoptera: Trichogrammatidae) in Uruguay. Les Colloques de l'INRA, *56*: 165-169.

Monje, J.C., 1995. Present significance of *Trichogramma* spp. (Hymenoptera: Trichogrammatidae) for the control of sugarcane borers in the Americas. Mitt. Dtsch. Ges. Allg. Angew. Ent., *10*: 287-290.

Pinto, J.D., 1992. Novel taxa of *Trichogramma* from the New World tropics and Australia (Hymenoptera: Trichogrammatidae). J. New York Entomol. Soc., *100*: 621-633.

Pinto, J.D., 1997. Taxonomia de Trichogrammatidae (Hymenoptera) com ênfase nos gêneros que parasitam Lepidoptera. In Parra J.R.P. & R.A. Zucchi (eds). *Trichogramma* e o controle biológico aplicado, pp 13-39. FEALQ, Piracicaba.

Pinto, J.D., 1998. Systematics of the North American species of *Trichogramma* Westwood (Hymenoptera: Trichogrammatidae). Mem. Entomol. Soc. Washington, 22: 1-287.

Pinto, J.D. & R. Stouthamer, 1994. Systematics of the Trichogrammatidae with emphasis on *Trichogramma*. In Wajnberg E. & S.A. Hassan (eds). Biological control with egg parasitoids, pp 1-36. Cab International, Oxon (UK).

Pintureau, B., 1993. Enzyme polymorphism in some African, American and Asiatic *Trichogramma* and Trichogrammatoidea species (Hymenoptera: Trichogrammatidae). Biochem. Syst. Ecol., *21*: 557-573.

Pintureau, B. & M. Babault, 1988. Systématique des espèces africaines des genres *Trichogramma* Westwood et Trichogrammatoidea Girault (Hym. Trichogrammatidae). Les Colloques de l'INRA, *43*: 97-120.

Silveira Guido, A. & A. Ruffinelli, 1956. Primer catálogo de los parásitos y predatores encontrados en el Uruguay. Bol. Tec. Fac. Agronomía, *32*: 1-78.

Voegele, J. & B. Pintureau, 1982. Caractérisation morphologique des groupes et espèces du genre *Trichogramma* Westwood. Les Colloques de l'INRA, *9*: 45-75.

Zucchi, R.A. & R.C. Monteiro, 1997. O gênero *Trichogramma* na América do Sul. In Parra J.R.P. & R.A. Zucchi (eds). *Trichogramma* e o controle biológico aplicado, pp 41-66. FEALQ, Piracicaba.

Zucchi, R.A.; J.D. Pinto & R.C. Monteiro, 1996. Some records on the *Trichogramma* species associated with *Diatraea* in the New World (Hymenoptera: Trichogrammatidae-Lepidoptera: Pyralidae). Proc. XX Int. Cong. Entomol., Florence: 639.

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PREADULTS INTERACTIONS BETWEEN THE COLONIZING *DROSOPHILA SUBOBSCURA* AND THE ESTABLISHED SPECIES *D. HYDEI, D. IMMIGRANS* AND *D. MELANOGASTER* (DIPTERA: DROSOPHILIDAE) IN CHILE USING NATURAL SUBSTRATES.

ZAID ALAMIRI[1]

ABSTRACT

The Palaearctic species *Drosophila subobscura* recently colonised Chile successfully. The results showed that the presence of the well-established species did not interfere with *D. subobscura* oviposition behaviour. When it competed on limited food resources with *D. immigrans* and *D. melanogaster;* its developmental time and viability were significantly affected. On the other hand, the development time *D. hydei* and *D. immigrans* only showed considerable reduction; however, all of these three species did not suffer changes in their viability. A double edge mechanism could explain the results reported here. The larval wastes of *D. subobsucra* facilitate the development of these established species while the metabolic wastes of the latter, except *D. hydei,* affect that of *D. subobscura.* An interesting thing is that competitive interactions had no significant influence on *D. subobscura* body size. This, in the context of the reproductive fitness, could explain its colonisation ability in spite of being poor competitor.
Key words: colonisation, competitive interactions, *D. subobscura* and larval metabolic wastes.

RESUMEN

Recientemente, la especie paleártica *D. subobscura* ha colonizado a Chile exóticamente. La presencia de la otras especies bien establecidas, como han mostrado los resultados de este trabajo, no intervino con la conducta de oviposición de este especie. Sin embargo, cuando estuvo (*D. subobscura*) en competencia, sobre un recurso limitado de alimento, con *D. immigrans* y *D. melanogaster,* tanto su tiempo de desarrollo como su viabilidad fueron afectados significativamente. Por el otro lado, el tiempo de desarrollo de solamente *D. hydei* y *D. immigrans* fue disminuido considerablemente. En cuanto a la viabilidad de esas tres especies, ninguno mostró cualquier cambio. Los resultados obtenidos podrían ser interpretados en base de un mecanismo de doble sentido que se trata de que los desechos larvales de la especie colonizadora han facilitado el crecimiento y el desarrollo de las tres especies con quienes *D. subobscura* coexiste en la naturaleza; Sin embargo ella misma sufrió de los desechos metabólicos de las últimas, con excepción de los de *D. hydei.* Una cosa interesante es que la interacción competitiva con las tres especies no tuvo influencia sobre su masa corporal. Mirándolo dentro del contexto de su eficiencia reproductiva, eso podría explicar su habilidad colonizadora a pesar de ser mala competidora.
Palabras clave: colonización, interacciones competitivas, *D. subobscura* y desechos metabólicos larvales.

INTRODUCTION

Drosophila subobscura Collin is a typically Palaearctic species distributed all over Europe, North Africa and Asia Minor, with the exception of the northern parts of Scandinavia and Finland (Lakoova & Saura, 1982). It was detected in Chile for the first time in Puerto Montt (Lat. 41° 60´S) in 1978 (Brncic & Budnik, 1980). Few years later, it expanded its distribution range, and thus occupying along North - South slope so ecologically contrasting zones where it is hot & semi- arid in the North, and windy, wet and cold in the South. It was found far southern as Punta Arenas (Lat. 54° 40´S9), associated with native wild flora such as *Berberis*

[1]Department of Entomology, University of California, Riverside, CA, 92521. E-mail: zalamir@hotmail.com
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