SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

Thrips Species (Thysanoptera) Collected at Parque Estadual de Itapuã, Viamão, RS, Brazil[1]

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Espécies de Tripes (Thysanoptera) Coletadas no Parque Estadual de Itapuã, Viamão, RS

RESUMO - A ordem Thysanoptera reúne espécies fitófagas, fungívoras e algumas predadoras. Estudos recentes têm enfatizado a diversidade de padrões de comportamentos desses pequenos insetos. Das 5.500 espécies conhecidas dispersas pelo mundo, aproximadamente 10% foram registradas no Brasil (a maioria em áreas tropicais). Neste trabalho, efetuou-se o levantamento da tisanopterofauna meridional, 800 km ao sul do Trópico de Capricórnio. A área de estudo foi o Parque Estadual de Itapuã (30°22'S 51°02'W), Viamão, RS, com os tripes coletados em flores, ramos, gramíneas e folhedo, de junho/1999 a maio/2001. O total de 83 espécies foi encontrado em 32 gêneros, porém apenas 29 dessas espécies puderam ser identificadas, demonstrando como a fauna de insetos do sul do Brasil carece de estudos.

PALAVRAS-CHAVE: Insecta, tisanopterofauna, diversidade

ABSTRACT - The order Thysanoptera comprises mostly phytophagous or fungivorous species, with a few species that are predators. Recent studies have emphasized the diversity of behavioural patterns amongst these diminutive insects. From the 5,500 species known worldwide, about 10% are recorded from Brazil, mostly tropical areas. In this work we surveyed the Thysanoptera fauna of a southern locality, 800 km south of the Tropic of Capricorn. The study site was "Parque Estadual de Itapuã" (30°22´S 51°02´W), Viamão, RS, and thrips were sampled from wild flowers, branches, grass and litter, from June 1999 to May 2001. A total of 83 species in 32 genera was found, but only 29 of these species could be identified, emphasizing the poor knowledge of the insect fauna of southern Brazil.

KEY WORDS: Insecta, thysanopterofauna, diversity

The greatest diversity of animals is found in groups where the individuals are of small size and high mobility, which allows them access to an abundant variety of food and other resources (Wilson 1997). This article deals with a group of tiny insects, the thrips, in which most species are phytophagous or fungivorous, with a few predatory on other arthropods. The range of plants used for breeding is considerable, including a few bryophytes, ferns and cycads, as well as the leaves or flowers of many higher plants (Mound & Marullo 1996, Mound 2000, Mound & Terry 2001). Recent studies have emphasized a diversity of behaviour patterns amongst these insects, including sociality (Crespi & Mound 1997), domicile construction (Mound & Morris 2001), gall-induction (Mound & Kranz 1997), as well as a remarkable case of ectoparasitism in Brazil (Izzo *et al*. 2002, Pinent *et al*. 2002).

There are over 5,500 described species of thrips worldwide, of which 520 are recorded from Brazil (Monteiro 2002). Nevertheless, there is a substantial gap in our knowledge of native species, particularly about their biology and host associations. According Mound (1996), more than 100 of the total described species are associated with one or more crops. However, in Brazil only a few of these cause serious damage (Monteiro *et al*. 1999). From the agricultural point of view, it is important to know the diversity of species present not only on cultivated plants but also on surrounding weeds and native plants, since many species are associated with the latter (Monteiro *et al*. 1996). Records of Thysanoptera from the native plants of Rio Grande do Sul are nonexistent. Conservation units protect important parcels of diversity, mostly sites with a minimum of anthropic disturbance. Knowledge gathered from these areas forms the necessary ecological basis for environmentally sound management (Brito *et al*. 1999). Thrips species surveying in units, such as "Parque Estadual de Itapuã" (PEI), may help direct priority

actions and contribute to the preservation and management of other typically neotropical taxa.

The location of PEI (30°22´S 51°02´W) in the neotropical region, at the transition zone between the tropical Brazilian-Guianean subregion, in which forests prevail, and the temperate Andean-Patagonic subregion, with open formations such as the chaco and pampa, and on the east, the morphostructural domain of "Província Costeira" with isolated small lakes in which restinga woods, juncais and grasses remain (Menegat *et al*. 1998), generates a characteristically very rich flora and fauna, since it embraces elements of the three regions (Fitkau *et al.* 1969 apud Rio Grande do Sul 1997).

The PEI lies at the so-called Southeast Basins, by the Bacia Hidrográfica do Guaíba and the Laguna dos Patos, which make up about 75% of its perimeter. According to the Köppen system, the climate in the region is subtropical humid, variety Cfa, colder month average air temperature between -3°C and 18°C, average annual rainfail about 1,300 mm and annual air temperature average 17.5°C. The landscape in the park is varied and influenced by a mixture of geological formations (sandbanks, granitic hills, etc.). Mostly, the vegetation is constituted by fields and forests, which also vary much in terms of height, density and state of conservation (Rio Grande do Sul 1997).

More than three hundred plant species occur in the Park, of which, *Ficus organensis* (Moraceae), *Erythrina cristagalli* (Fabaceae), *Syagrus romanzoffiana* (Arecaceae), *Butia capitata* (Arecaceae) and the large number of Orchidaceae, Bromeliaceae and Cactaceae deserve mention. Itapuã is one of the few areas where the several plant physiognomies that formerly occurred in Guaíba borders and in the surrounding granitic hills still occur.

The diverse ecosystems also shelter many animal species, several threatened with extinction, e.g. *Allouata fusca* (brown howler monkey), *Lutra longicaudis* (otter) and *Caiman latirosris* (yellow throat caiman). The Lagoa Negra, a 1,750 hectar lagoon, is an important refuge for migratory birds and hundred of others wild avifauna species (Rio Grande do Sul 1997).

From June 1999 to May 2001, the Thysanoptera fauna at PEI was surveyed monthly. In each occasion random samples of flowers, branches, grass tussocks and litter were taken. At the laboratory, the thrips were sorted from the samples, and mounted on microscope slides (Palmer *et al*. 1989, Mound & Marullo 1996, Mound & Kibby 1998).

Thrips species were identified, when possible, using keys in Sakimura & O'Neill (1979), De Santis (1980), Mound & Marullo (1996), and Moritz *et al.* (2001). Still, the available published information, literature and keys focuses primarily on thrips species as crop pests, and neotropical Thysanoptera remain very poorly known. Thus, in many cases, it was not possible to get to species level, and individuals are listed under sub-family or genus, and coded by number. Among these, many will probably prove to be species that are as yet undescribed. Those that could be safely recognized as such are marked accordingly. Because so little is known about Brazilian thrips it is difficult to make faunal comparisons. All species unnamed are being studied in full detail and as soon as these studies are concluded the results will be published.

Specimens are deposited in the collection of the Laboratório de Ecologia de Insetos at Departamento de Zoologia, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Brazil.

Results and Discussion

Fifteen species and 14 genera – all new records for the study area in this conservation unit in Rio Grande do Sul – were added to those listed on Pinent *et al*. (2002), which was the first survey on Thysanoptera in southern Brazil. A total of 29 known species, along with those as yet unnamed species, represent 32 genera. The following comments apply to the named species and important genera.

PHLAEOTHRIPIDAE

Adraneothrips alternatus Hood, 1925, ***A. ?andrei*** Medina Gaud, 1961, ***A. fuscicollis*** Hood, 1925. The fungus-feeding species were collected in leaf litter. They are very commom on handing dead leaves in Central America and are frequently taken in leaf litter (Mound & Marullo 1996). *A. alternatus* was recorded by Monteiro (1996) from São Paulo State. In the present work a few individuals were collected on *Hyptis mutabilis* (A. Rich.) Briq. (Lamiaceae) flowers and *Doryopteris multipartita* (Fée) Sehnem (Pteridaceae) branches. *A. ?andrei* and *A. fuscicollis* were taken only in leaf litter and were not previously recorded from Brazil.

Bamboosiella cingulata Hood. A few individuals were collected on *Myrciaria cuspidata* Berg. (Myrtaceae) and *Homolepis glutinosa* (Sw.) Zuloaga & Soderstr. (Poaceae) leaves. According to Moritz *et al.* (2001) this species breeds on the leaves of various tropical grasses being widespread in tropical countries including Thailand, Australia, Hawaii, several Caribbean Islands and Florida.

Chamaeothrips ?jucundus Hood, 1919. Two individuals of this curious thrips were collected in leaf litter, suggesting that the species is not very abundant. From the two species included in this genus, *C. jucundus* was recorded from Brazil (Mound & Marullo 1996) but little is known concerning it.

Craniothrips urichi Bagnall, 1915. Described from Trinidad on the leaves of *Inga* sp. (Leguminosae) and recorded from Costa Rica on the same arboreal genus (Mound & Marullo 1996), this species is here recorded for the first time in Brazil. It was collected abundantly in *Leandra australis* (Cham.) Cogn. (Melastomataceae) flowers and leaves, Also in *Polypodium lepidopteris* (Langsd. & Fisch.) Kze. (Polypodiaceae) and *Triumpheta* sp. (Tiliaceae) partially concealed by hairs arising from the leaves.

Haplothrips fiebrigi Priesner, 1931. It was collected more abundantly in flowers of *Chrysanthemum mycones* L. (Asteraceae), also in *Eryngium* sp. (Apiaceae), *Senecio heterotrichus* DC. (Asteraceae) and in *P. lepidopteris*. Described from Paraguay and Argentina didn't have been recorded in Brazil until now, the members of this species complex

need further study, according to Mound & Marullo (1996).

Haplothrips ?gowdeyi Franklin, 1908. This species was collected in leaf-litter, and is listed form Brazil by Monteiro *et al.* (1996) from São Paulo. It is probably African in origin, but is one of the most common flower-thrips of the Caribbean area, and is now widespread around the tropics (Mound & Marullo 1996).

Hoplothrips ?fungi Zetterstedt, 1828. One adult of this fungus-feeding thrips was collected in *Casearia decandra* Jacq. (Flacourtiaceae) branches. It is widespread around the northern hemisphere temperate zone, breeding on dead branches and twigs (Moritz *et al*. 2001). There are almost 150 species in this genus exhibiting a wide range of body structure. Mound & Marullo (1996) listed 34 species from Central and South America.

Smicrothrips particula Hood, 1952. This is the only species in this genus. Described by Hood (1952) from Nova Teutonia, Santa Catarina, Brazil from *Lantana* sp. (Verbenaceae), it was collected in large numbers from *H. glutinosa*, *Panicum* sp. and *Saccharum* cf. *angustifolium* (Nees) Trin. (Poaceae) tussocks and in smaller number from Asclepiadaceae (*gen. et sp. indet.), Cordia verbenaceae* DC. (Boraginaceae), *Myrcia* sp. (Myrtaceae) branches, and *Coccocypselum* sp. (Rubiaceae) and *Verbesina subcordata* DC. (Asteraceae) flowers. Less than 1.00 mm in length, this minute yellow thrips is similar to *Preeriella* species in structure, but has antennal segments VI & VII fused. It is discussed by Mound & Marullo (1996) under *Hyidiothrips* leaf-litter species. Nothing is known in the literature about its biology. Males, females, immatures and eggs were collected in this study, under and on leaves, but especially close to the main nervure in grass tussocks. *S. particula* was observed feeding on mites on *H. glutinosa*.

Stephanothrips ?occidentalis Hood & Williams, 1925. This species was collected in leaf litter. Presumably feeding on fungal hyphae, it breeds on dead leaves, twigs and branches according to Moritz *et al* (2001). Probably originally from S.E. Asia, the species is now widespread in tropical countries (Mound & Marullo 1996) including Brazil (Rio Grande do Sul). About 20 species are placed in this genus of which *S. occidentalis* differs from its congeners in having a well developed hook-like hamus on the external margin of the fore tarsus (Mound & Marullo 1996).

HETEROTHRIPIDAE

Heterothrips ?peixotoa Del-Claro, Marullo & Mound, 1997. Two adults of this species were collected on *Eryngium* sp. (Apiaceae) flowers. It was described from Minas Gerais, Brazil in the flowers of *Peixotoa tomentosa* (Malpyghiaceae) (Del-Claro *et al*. 1997).

THRIPIDAE

Anaphothrips ?sudanensis Trybom, 1911. One specimen was collected on *H. glutinosa* leaf. The species breeds on the leaves of grasses and cereal crops, including sugar cane, in tropical and sub-tropical countries (Moritz *et al.* 2001).

Aurantothrips ?orchidaceus Bagnall, 1909. A few specimens were collected in *V. subcordata* and *Epidendrum fulgens* Brongn. (Orchidaceae) branches. Recorded from England in greenhouses, also Mexico, Guatemala and Colombia. Mound & Marullo (1996) indicate that it remains unclear if one or two species are involved in this genus.

Chaetisothrips ?striatus Hood, 1935. One adult and many immatures were collected in *Chiococca alba* (L.) A.S. Hitchc. (Rubiaceae) flowers, inside its petals. This genus was considered endemic to the Carribean and Central American region. However, several females of a species close to *striatus* were collected at Piracicaba, Brazil (SP),but few reliable host-plant records are available (Mound & Marullo 1996).

Danothrips ?trifasciatus Sakimura, 1975. Collected in *L. australis* leaves. This species is recorded in Florida as feeding in flowers and on young leaves, causing damage to citrus (Moritz *et al.* 2001). No damage was observed in the present work.

Frankliniella Karny, 1910. This genus includes the largest number of species in this work. Fifteen species of the genus were collected, although only eight were identified. ***F. bertelsi*** (De Santis, 1967), ***F. bruneri*** Watson, 1926, ***F. chamulae*** Joansen, 1981, ***F. gemina*** Bagnall, 1919, ***F. insularis*** Franklin, 1908, ***F. nakaharai*** Sakimura & O'Neill, ***F. serrata*** Moulton, 1933 and ***F. williamsi*** Hood, 1915. These species were frequently abundant in flowers of Asteraceae, Polygalaceae, Verbenaceae, Apiaceae, Lamiaceae, Tiliaceae, Boraginaceae, Cyperaceae, Fabaceae, Malpighiaceae, Myrtaceae, Sapindaceae, Comellinaceae and Poaceae, many of which are spontaneous native hosts in Brazil and in Rio Grande do Sul (Pinent – unpublished). *F. insularis*, is cited as a crop pest by Silva *et al.* (1968), and recorded from Brazil (Bahia, Espírito Santo, Minas Gerais, São Paulo, Santa Catarina and Rio Grande do Sul). Widespread in the Neotropics, in Costa Rica it is recorded as a minor pest in the flowers of leguminous crops (Mound & Marullo 1996). *F. williamsi* was collected in *Chrysanthemum mycones* L. (Asteraceae) and in *L. camara* (Verbenaceae) flowers. It was described from specimens collected on corn in the USA, and is associated with corn in Minas Gerais, São Paulo, Paraná and Santa Catarina (Monteiro *et al*. 2001). *Frankliniella* is a large genus of about 180 species, 90% of which are from the Neotropics (Jacot-Guillarmod 1974), and according to Moritz *et al*. (2001) the lack of native species of *Frankliniella* in Africa and Australia suggests that the genus may have evolved after the break-up of Gonwanaland, and after the separation of Africa from South America.

Leucothrips ?nigripennis Reuter, 1904. In this study, only one adult was collected in *Panicum* sp. (Poaceae). The species breeds on the fronds of several small ferns, and is recorded from northern Europe and USA in greenhouses, Brazil, southern India and Australia (Monteiro 2002, Moritz *et al*. 2001).

Microcephalothrips abdominalis Crawford, 1910. Adults

and immatures were collected on *Porophyllum* sp. (Asteraceae), *Senecio heterotrichus* DC. (Asteraceae) and *Stachytarpheta cayennensis* (L.P.Rich) Vahl. (Verbenaceae), more abundantly inside the flowers and bracteas. Cited from Brazil by Monteiro *et al*. (1996) and Monteiro (2002) in a checklist, there is only one species in this genus, and this is widespread throughout the tropics and subtropics.

Neohydatothrips ?flavens Moulton, 1941. This species was collected on seven different plants, but most abundantly on *Dodonea viscosa* L. (Sapindaceae) and *Triumphetta abutiloides* St. Hill. flowers and leaves, these presumably being its host-plants. The eggs were observed frequently next and on the middle vein. There are about 80 species in this genus, of which few seem to be associated with crops. However, *N. pseudannulipes* Johansen has become widespread as a pest of the garden plant *Tagetes*, having been found in Florida, Mexico, Costa Rica, Brazil, Hawaii, Japan, and easter Australia (Mound & Kibby 1998).

Heliothrips haemorrhoidalis Bouché, 1833. This species was collected on *Casearia decandra* Jack. (Flacourtiaceae), *P. lepidopteris* (Polypodiaceae) and on *D. viscosa*. It is a potential crop-pest on *Diospyros* sp. (Ebenaceae), *Citrus* sp. (Rutaceae), *Syzygium* sp. (Myrtaceae), and other important crops in Rio Grande do Sul and Brazil (Gallo *et al*. 2002). This thrips was cited by Monteiro *et al.* (1999) as a pest native to Brazil on *Macadamia* sp. (Proteaceae). Originally from south western Brazil the greenhouse thrips is now found throughout the tropics and subtropics on a wide range of plants (Moritz *et al*. 2001).

Hoodothrips lineatus Hood, 1928. This was collected on *L. australis*, *S. cayennensis* flowers and on *Lantana camara* L. (Verbenaceae) leaves, although little is known of its biology. It is a member of the Panchaetothripinae, of which only 14 of the 35 known genera are recorded from the Neotropics (Mound & Marullo 1996).

UNIDENTIFIED THRIPIDAE

In addition to the species listed above, many other as yet unnamed species were also found of which some genera deserve highlighting as follows:

Arachisothrips Stannard. Adults and immatures were collected in leaf litter, confirming that members of this genus are amongst the most bizarre thrips known, with grossly enlarged peanut shaped forewings. From the three members of this genus, *A. millsi* Stannard was described from Jamaica, recorded from Mexico, southern Brazil and in Costa Rica (Mound & Marullo 1996).

Ceratothripoides Bagnall. Mound & Marullo (1996) considered that this genus is best restricted to a group of species from Africa, although several Neotropical species remain listed under this name. In the present work, similar species were collected in *S. cayennensis* flowers and *Vernonia nudiflora* Less. (Asteraceae) branches.

Halmathrips Hood. Specimens were colleted on *Casearia decandra* Jacq. (Flacourtiaceae) leaves. Five species have been described in this genus, but none have been recorded previously form Brazil. They probably all feed on the leaves of forest trees (Mound & Marullo 1996).

Paraleucothrips Johansen. The type species of this genus, *P. minusculus* Johansen, was taken in the Sierra Madre Oriental, Mexico. Based on a single small, pale female, the species was subsequently recorded from Costa Rica (Mound & Marullo 1996). The genus has not previously been recorded from Brazil, but PEI specimens were collected in *C. verbenaceae* leaves, *L. australis* leaves and flowers, *Monina oblongifolia* Arechav. (Polygalaceae) and *L. camara* flowers.

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