



## Disjunct distribution or recent introduction? The North American *Tylothrips osborni* in Turkey (Thysanoptera, Phlaeothripidae)

Asiye Uzun Yiğit<sup>1\*</sup> , Ozan Demirözer<sup>1</sup> , Kambiz Minaei<sup>2</sup> & Laurence A. Mound<sup>3</sup>

1 Department of Plant Protection, Faculty of Agriculture, Applied Science University of Isparta, 32260, Isparta, Turkey. [asiyeuzun@isparta.edu.tr](mailto:asiyeuzun@isparta.edu.tr); [ozandemirozer@isparta.edu.tr](mailto:ozandemirozer@isparta.edu.tr)

2 Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran. [kminaei@shirazu.ac.ir](mailto:kminaei@shirazu.ac.ir)

3 Australian National Insect Collection, CSIRO, Canberra, Australia. [laurence.mound@csiro.au](mailto:laurence.mound@csiro.au)

**ABSTRACT.** The genus and species of fungus-feeding thrips, *Tylothrips osborni* (Hinds), are newly recorded from Turkey based on two apterous females collected from wheat. Taxonomic characterization of the genus and species is provided and illustrated. This is the sixth record in Europe of this American species, and the significance of this disjunct distribution is discussed.

**Key words:** new record, fungus-feeding, thrips

**Received:**  
18 August, 2021

**Accepted:**  
21 September, 2021

**Published:**  
11 October, 2021

**Subject Editor:**  
Lida Fekrat

**Citation:** Uzun Yiğit, A., Demirözer, O., Minaei, K. & Mound, L.A. (2021) Disjunct distribution or recent introduction? The North American *Tylothrips osborni* in Turkey (Thysanoptera, Phlaeothripidae). *Journal of Insect Biodiversity and Systematics*, 7 (4), 375–381.

### Introduction

Despite the considerable progress in the systematic and faunistic studies of thrips over the past 50 years, as reflected in [ThripsWiki \(2021\)](#) and [Mound & Cavalleri \(2021\)](#), the taxonomic identity and relationships of many of the major Thysanoptera groups in the family Phlaeothripidae remain enigmatic. Host-plant relationships of the many leaf-feeding species in the species-rich *Liothrips*-lineage are largely unknown ([Hakimara et al., 2019](#)), and systematic relationships among many monotypic genera are poorly evaluated ([Mound & Tree, 2021b](#)). There are similar problems regarding fungus-feeding species in the *Phlaeothrips*-lineage, particularly due to the lack of field studies on many species that exhibit sexual and alary dimorphisms ([Mound et al., 2020](#)), as well as remarkable polyphenisms associated with body size ([Mound & Tree, 2021a](#)). For Europe and the Mediterranean region, comprehensive accounts of Phlaeothripidae ([Priesner, 1964, 1965](#)) are now seriously out of date. For Turkey, the earliest publication on thrips dates from 1934 ([Bagnall, 1934](#)),

Corresponding author: Asiye Uzun Yiğit, E-mail: [asiyeuzun@isparta.edu.tr](mailto:asiyeuzun@isparta.edu.tr)

**Copyright** © 2021, Uzun Yiğit et al. This is an open access article distributed under the terms of the Creative Commons NonCommercial Attribution License (CC BY NC 4.0), which permits Share - copy and redistribute the material in any medium or format, and Adapt - remix, transform, and build upon the material, under the Attribution-NonCommercial terms.

but identification of Phlaeothripidae remains difficult in the absence of keys based on extensive reference collections. The published checklist of Thysanoptera from Turkey (Tunc & Hastenpflug-Vesmanis, 2016) lists 193 species in 64 genera, but only 9 of these are fungus feeding species. The purpose of this paper is to newly report from Turkey a species of fungus-feeding thrips in the genus *Tylothrips* Hood that was collected recently in a wheat field. The species has been reported unintentionally as *Hoplothrips caespitis* (Uzel) in the Ph.D. thesis of the first author (Uzun, 2020). This species was described originally from North America but has been recorded widely between New York State and Argentina. We discuss below if this thrips has a natural distribution across the Holarctic, or if it represents a more recent introduction across the Atlantic.

## Material and methods

Thrips specimens were mounted onto slides using Canada balsam after dehydration in a series of ethanol (Mound & Kibby, 1998). Photomicrographs and measurements (in microns) were made using an Olympus BX51 phase-contrast microscope with DP27 digital camera and cellSens software. The specimens have been deposited in the Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran.

## Results

### *Tylothrips* Hood

*Tylothrips* Hood 1937: 494. Type species *Tylothrips concolor* Hood, by monotypy.

There are 24 species listed in this genus (ThripsWiki, 2021), and all of these thrips are considered to be fungus-feeding in leaf litter (Mound, 1976, 1977). The genus appears to be essentially Neotropical, with 21 species known only from Panama and countries further South, although *T. osborni* (Hinds) is widespread further North across eastern North America. The remaining two species placed in this genus have been described from India (Sen & Muraleedharan, 1976; Varatharajan et al., 2015), but both descriptions lack sufficient detail to securely assess their generic relationships. One of them, *samirseni* Varatharajan, Singh & Bala, was based on a single male, and the published illustration indicates that the maxillary stylets are long and relatively close together in the head. The other, *indicus* Sen & Muraleedharan, was based on one female and one male and was illustrated as having an elongate pelta, and the pronotum with only three pairs of major setae. These character states suggest that both species may not be congeneric with *Tylothrips concolor*.

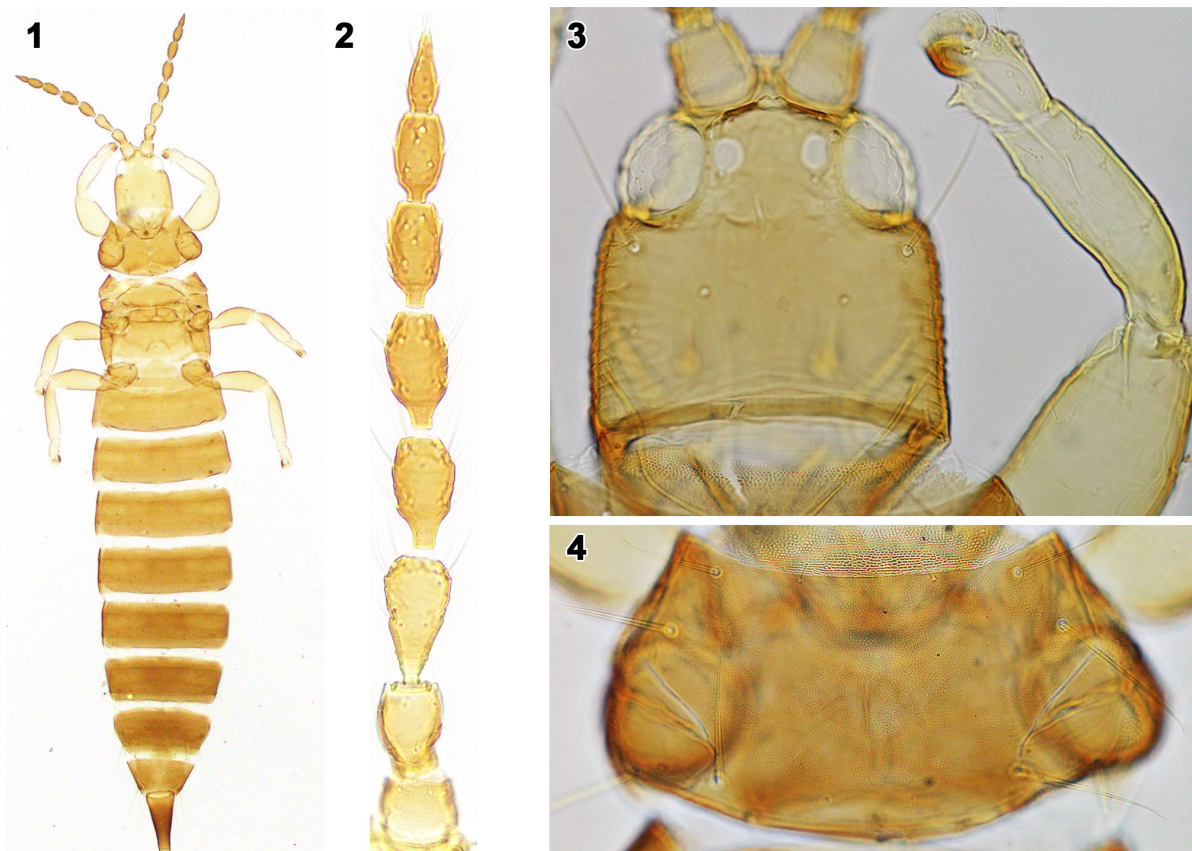
**Generic diagnosis:** Usually macropterous; antennae 8-segmented, III with 3 (rarely 2) sense cones, IV with 4 (rarely 3) sense cones. Head with or without reticulate sculpture, slightly produced in front of eyes; genae often constricted behind rounded eyes; maxillary stylets wide apart, retracted into head sometimes to postocular setae; mouth cone short and broadly rounded. Pronotum with 4 pairs of major setae, anteromarginal pair minute. Prosternal basantra well developed; mesopresternum transverse. Meso and metathorax ventrolaterally each with a pair of long, asymmetrical, capitate setae. Pelta usually small and D-shaped; tergites each with 2 pairs of weakly sigmoid wing-retaining setae; tergite IX of female with setae about as long as tube; sternite IX of male usually with large pore plate.

***Tylothrips osborni* (Hinds)***Eurythrips osborni* Hinds, 1902: 203

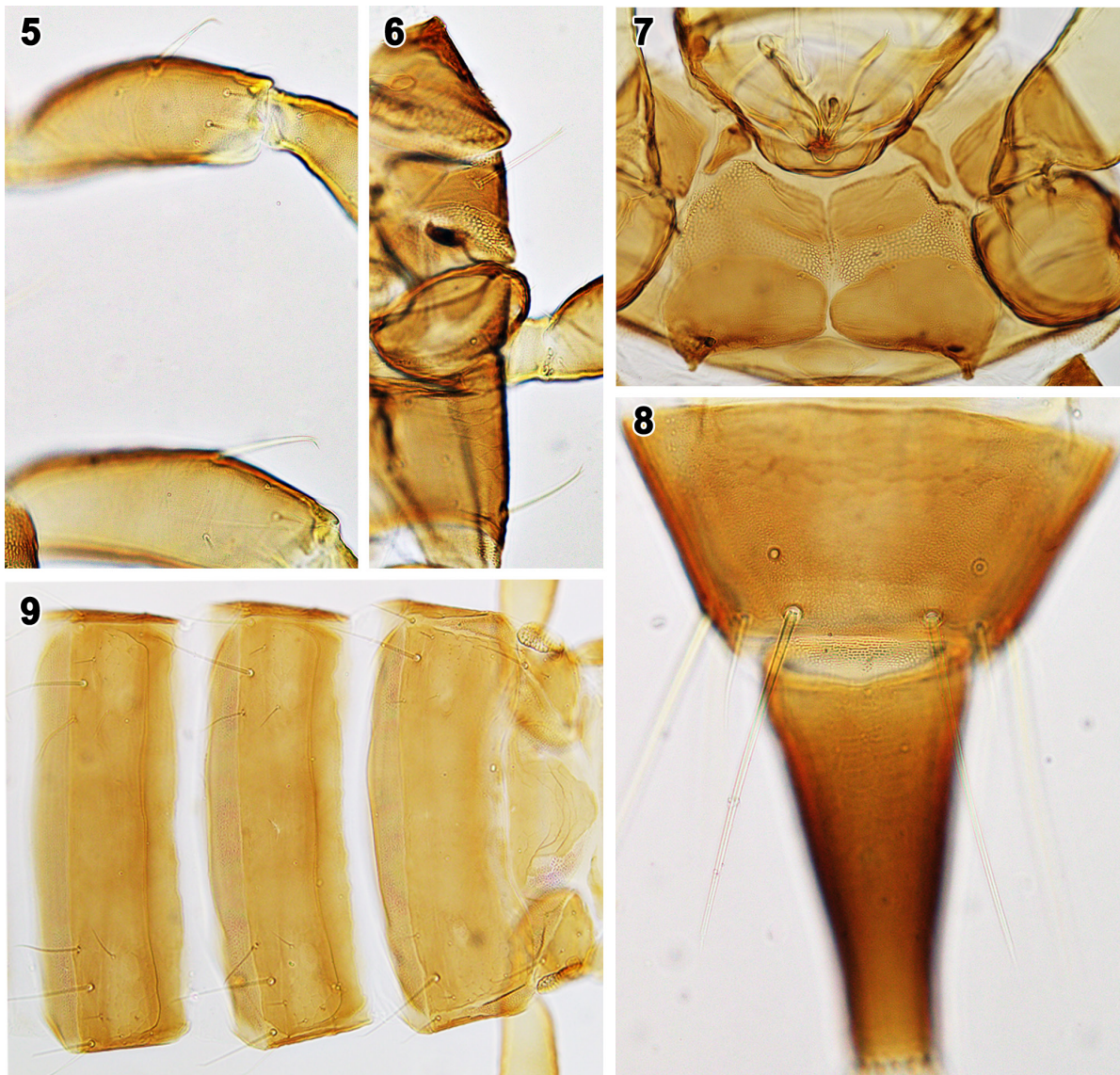
*Female aptera*. Body and legs brown (Fig. 1), tube darkest; antennal segments I-III brown yellowish, distal segments darker (Fig. 2); fore legs paler, all tarsi brownish-yellow; all major setae pale. Head a little longer than wide, not reticulate between postocular setae, cheeks narrowed to compound eyes without setae; vertex irregularly transversely striate; stylets retracted less than half-way to postocular setae; postocular setae weakly capitate (Fig. 3). Antennal segments III and IV with 3 and 4 sense cones respectively. Pronotum smooth, with 4 pairs of almost capitate setae (anteroangulars, midlaterals, epimerals and posteroangulars) (Fig. 4). Prosternal basantra and ferna developed, ferna wider than long (Fig. 7); mesopresternum transverse; metathoracic sternopleural sutures absent. Fore tarsal tooth developed; mid and hind femora each with one long capitate seta (Fig. 5); pterothorax ventrolaterally with a similar pair of setae (Fig. 6). Pelta almost bell shaped; abdominal tergites lateral setae weakly capitate (Fig. 9), setae on IX long and finely pointed (Fig. 8); tube smooth with straight sides, anal setae shorter than tube.

**Measurements.** Body length 1930. Head, length 170; width behind eyes 137; postocular setae 65. Pronotum, length 140; width 290; major setae anteroangulars 55, midlaterals 90, epimerals 80, posteroangulars 80. Tergite VI, setae S1 95. Tergite IX, setae S1 135. Tube, length 170; basal width 80. Antennal segments I-VIII, length 37, 40, 65, 55, 60, 52, 43, 40.

**Specimens examined.** TURKEY, Burdur: Çavdır (37°09'20.4" N, 29°38'0.30" E), 973 m, 2 females; from wheat, 25.v.2016 (A. Uzun Yiğit).



**Figures 1-4.** *Tylothrips osborni*. 1. Female; 2. Antenna; 3. Head & right fore leg; 4. Pronotum.



**Figures 5–9.** *Tylothrips osborni*. 5. Mid and hind femora; 6. Pterothorax (ventrolateral view); 7. Prosternum; 8. Abdominal tergite IX and tube; 9. Pelta and abdominal tergites II–IV.

### Discussion

This species was placed originally in the genus *Eurythrips*, and was retained in that genus in a revision and key to species by Mound (1976). However, in a re-examination of the various genera from the Americas that are associated with leaf litter (Mound, 1977), *osborni* was transferred to genus *Tylothrips* along with several other similar species. It was based originally on both sexes from Massachusetts, USA, but subsequently reported from New York State, Illinois and Florida, as well as Cuba, Panama and Trinidad (Mound, 1977; Goldarazena & Mound, 1998). More recently, this species has been reported from Europe, first from Spain (Goldarazena & Mound, 1998), then from Italy (de Marzo & Ravazi, 2007) and Germany (Ulitzka, 2013, 2021). A further record from Norway is actually based on a female extracted from plant materials imported from Germany (Kobro & Ulitzka, 2021). This new discovery of *T. osborni* in Turkey indicates that the species is now widespread in

the warmer parts of Europe. This southern European distribution might indicate a natural distribution across the Holarctic, given that *T. osborni* is distributed naturally as far north as New York in the Nearctic. However, this seems unlikely because none of the other members of the genus *Tylothrips* occur in Europe. The specimens from Turkey were collected from wheat fields, and previous authors indicate that this thrips might be associated with dry grasses. A more likely explanation for the apparently disjunct distribution of *T. osborni* is that it is another example of the effect of the extensive horticultural trade in live plants on the distributions of thrips (Mound, 1983) and many other insect species (Liebhold et al., 2012).

### Acknowledgments

This study was supported by Süleyman Demirel University Scientific Research Projects Coordination Unit (Project number: 4642-D2-16). The article is produced from the first author's 'Thysanoptera species of the cereal production areas in Lakes Region, distribution ratios and population fluctuations of important species and molecular characterization of some species of Phlaeothripidae' titled PhD thesis. The manuscript was improved through the advice and criticisms kindly provided by Dr. Manfred Ullitzka and an anonymous reviewer.

### Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

### ORCID

Asiye Uzun Yiğit: <https://orcid.org/0000-0002-4822-4762>

Ozan Demirözer: <https://orcid.org/0000-0001-7240-8898>

Kambiz Minaei: <https://orcid.org/0000-0002-0168-178X>

Laurence A. Mound: <https://orcid.org/0000-0002-6019-4762>

### References

- Bagnall, R.S. (1934) Contributions towards a knowledge of the European Thysanoptera V. *Annals and Magazine of Natural History*, 14, 481–500. <https://doi.org/10.1080/00222933408654924>
- de Marzo, L. & Ravazzi, G. (2007) Segnalazioni faunistiche Italiane. *Bollettino della Società Entomologica Italiana*, 139, 178–180. <https://doi.org/10.4081/BollettinoSEI.2016.91>
- Goldarazena, A. & Mound L.A. (1998) *Hindsiothrips navarrensis* sp.n. (Thysanoptera; Phlaeothripidae) from Spain, with the first record of *Tylothrips osborni* (Hinds) from Europe. *Entomologist's monthly Magazine*, 134, 319–324.
- Hakimara, M., Minaei, K., Sadeghi, S. & Mound, L. (2019) Fungus-feeding thrips in Iran with a new species of *Stictothrips* (Thysanoptera: Phlaeothripidae). *Zootaxa*, 4652 (3), 557–567. <https://doi.org/10.11646/zootaxa.4652.3.11>
- Hinds, W.E. (1902) Contribution to a monograph of the insects of the order Thysanoptera inhabiting North America. *Proceedings of the United States National Museum*, 23, 79–242. <https://doi.org/10.5479/si.00963801.26-1310.79>
- Hood, J.D. (1937) Studies on Neotropical Thysanoptera V. *Revista de Entomologia* 7, 486–530.
- Kobro, S. & Ullitzka, M. (2021) *Thrips orarius* sp. n. and six first records of thrips (Thysanoptera) from Norway. *Norwegian Journal of Entomology*, 68, 130–145.

- Liebhold, A.M, Brockerhoff, E.G., Garrett, L.J., Parke, J.L. & Britton, K.O. (2012) Live plant imports: The major pathway for forest insect and pathogen invasions of the US. *Frontiers in Ecology and the Environment*, 10, 135–143. <https://doi.org/10.1890/110198>
- Mound, L.A. (1976) American leaf-litter Thysanoptera of the genera *Erkosothrips*, *Eurythrips* and *Terthothrips* (Phlaeothripidae: Phlaeothripinae). *Bulletin of the British Museum (Natural History) Entomology*, 35, 27–64.
- Mound, L.A. (1977) Species diversity and the systematics of some New World leaf-litter Thysanoptera (Phlaeothripinae; Glyptothripini). *Systematic Entomology*, 2, 225–244. <https://doi.org/10.1111/j.1365-3113.1977.tb00371.x>
- Mound, L.A. (1983) Natural and disrupted patterns of geographical distribution in Thysanoptera (Insecta). *Journal of Biogeography*, 10, 119–133. <https://doi.org/10.2307/2844623>
- Mound L.A. & Cavalleri, A. (2021) Zootaxa 20th Anniversary Celebration: Insect Order Thysanoptera. *Zootaxa*, 4979 (1), 224–225. <https://doi.org/10.11646/zootaxa.4979.1.23>
- Mound, L.A. & Kibby, G. (1998) *Thysanoptera: An Identification Guide*. CAB International, Wallingford. 70 pp.
- Mound, L.A. & Tree, D.J. (2021a) *Eurynothrips* Bagnall (Thysanoptera, Phlaeothripinae): a rare and long-lost Australian genus, with one new gall-inducing species. *Zootaxa*, 5005 (3), 251–256. <https://doi.org/10.11646/zootaxa.5005.3.1>
- Mound, L.A. & Tree, D.J. (2021b) Taxonomic problems with *Gynaikothrips* and related genera (Thysanoptera, Phlaeothripinae): the *ficorum/uzeli* complex and taxa endemic to Australia. *Zootaxa*, 5023 (4), 537–554. <https://doi.org/10.11646/zootaxa.5023.4.4>
- Mound, L.A., Wang, J. & Tree, D.J. (2020). The genus *Hoplothrips* in Australia (Thysanoptera, Phlaeothripinae), with eleven new species. *Zootaxa*, 4718 (3), 301–323. <https://doi.org/10.11646/zootaxa.4718.3.1>
- Priesner, H. (1964) Ordnung Thysanoptera (Fransenflügler, Thripse). In Franz, H. *Bestimmungsbücher zur Bodenfauna Europas*, 2, 1–242. Akademie-Verlag.
- Priesner, H. (1965) A monograph of the Thysanoptera of the Egyptian deserts. *Publications de l'Institut Desert d'Egypte*, 13, 1–549.
- Sen, S. & Muraleedharan, N. (1976) New genera and species of Tubulifera (Thysanoptera: Phlaeothripidae) from Assam and Meghalaya. *Entomon*, 1 (2), 175–183.
- ThripsWiki (2021) *ThripsWiki - providing information on the World's thrips*. Available from: [http://thrips.info/wiki/Main\\_Page](http://thrips.info/wiki/Main_Page) [Accessed 10th August 2021].
- Tunc, I. & Hastenpflug-Vesmanis, A. (2016) Records and checklist of Thysanoptera in Turkey. *Turkish Journal of Zoology*, 40 (5), 769–778. <https://doi.org/10.3906/zoo-1512-37>
- Ullitzka, M.R. (2013) Daten zur Thysanopteren-Faunistik der Ortenau und angrenzender Gebiete mit einem Erst-nachweis von *Tylothrips osborni* (HINDS, 1902) für Mitteleuropa (Insecta: Thysanoptera). *Carolinea*, 71, 135–151.
- Ullitzka, M.R. (2021) Erstnachweis des Fransenflüglers *Thorybothrips unicolor* (Schille, 1911) für Deutschland mit Anmerkungen zu weiteren bemerkenswerten Thysanopterenfunden aus Thüringen (Insecta: Thysanoptera). *Thüringer Faunistische Abhandlungen*, 25, 141–148.
- Uzun, A. (2020) Thysanoptera species of the cereal production areas in lakes region, distribution ratios and population fluctuation of important species and molecular characterization of some species of Phlaeothripidae. (Unpublished Ph.D Dissertation), The Institute of Graduate Education, University of Applied Sciences, Turkey (in Turkish).
- Varatharajan, R., Singh, K. N. & Bala, K. (2015) A new species of *Tylothrips* (Insecta: Thysanoptera) with new records of four terebrantians and four tubuliferans from Manipur, northeastern India. *Journal of Threatened Taxa*, 7 (5), 7157–7163. <https://doi.org/10.11609/JOTT.o3733.7157-63>

## پراکنش جدا شده یا ورود جدید؟ گونه آمریکای شمالی *Tylothrips osborni* در ترکیه (Thysanoptera, Phlaeothripidae)

آسیه اوزون بیگیت<sup>۱\*</sup>، اوزان دمیروزر<sup>۱</sup>، کامبیز مینایی<sup>۲</sup> و لورنس آ. موند<sup>۳</sup>

۱ گروه گیاه‌پزشکی، دانشکده کشاورزی، دانشگاه علوم کاربردی اسپارتا، اسپارتا، ترکیه.

۲ گروه گیاه‌پزشکی، دانشکده کشاورزی، دانشگاه شیراز، شیراز، ایران.

۳ موزه ملی حشرات استرالیا، سی اس آی آر او، کانبرا، استرالیا.

\* پست الکترونیکی نویسنده مسئول مکاتبه: [asiyeuzun@isparta.edu.tr](mailto:asiyeuzun@isparta.edu.tr)

| تاریخ دریافت: ۲۷ مرداد ۱۴۰۰ | تاریخ پذیرش: ۳۰ شهریور ۱۴۰۰ | تاریخ انتشار: ۱۹ مهر ۱۴۰۰ |

**چکیده:** جنس و گونه تریپس قارچ خوار، *Tylothrips osborni* (Hinds)، براساس دو نمونه ماده بی بال جمع آوری شده از گندم از ترکیه گزارش می‌شود. ویژگی‌های تاکسونومیک جنس و گونه به همراه شکل‌های مربوطه ارائه شده است. این ششمین گزارش این گونه آمریکایی در اروپا است و اهمیت پراکنش جدا شده بحث شده است.

**واژگان کلیدی:** گزارش جدید، قارچ خواری، تریپس