Dolichomitus irritator (Hymenoptera: Ichneumonidae): A New Parasite of Dectes texanus (Coleoptera: Cerambycidae) in Soybeans

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DOLICHOMITUS IRRITATOR (HYMENOPTERA: ICHNEUMONIDAE): A NEW PARASITE OF DECTES TEXANUS (COLEOPTERA: CERAMBYCIDAE) IN SOYBEANS

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The Ichneumonidae is a large insect family with over 4,900 species in the Nearctic region (Yu et al. 2005). Ichneumonids are obligate parasitoids, or hyperparasitoids, but they have not been used as successfully as classical biological control agents as hymenopteran families within Chalcidoidea and the Braconidae (Daly et al. 1998). Dolichomitus irritator (F.) (Ichneumonidae: Pimplinae) is common in woodland and brush habitats in eastern North America (Townes & Townes 1960) and occurs south to Costa Rica (Cancino et al. 2010). Dolichomitus irritator larvae are external parasites (Chittenden 1893) of larvae of wood boring insects (Townes & Townes 1960). Table 1 lists previously known insect hosts on which development of D. irritator has been witnessed or implied and the associated plant relationship. Unequivocal host records are very difficult to attain for parasites of wood boring insects and these records are often inferred from rearing parasite and host in the same logs.

Dectes texanus LeConte, is a native, univoltine, cerambycid beetle that, as a larva, primarily feeds within herbaceous plants in the Asteraceae over much of North America (Lingafelter 2007). Falter (1969) and Hatchett et al. (1973) first documented a host switch from plants in Asteraceae to soybeans (Glycine max (L.) Merr.; Fabales: Fabaceae). Since then, D. texanus larvae have been noted as a pest of soybeans in 14 U.S. states (Buschman & Sloderbeck 2010). Several species of braconids, ichneumonids, and pteromalids are known to parasitize D. texanus larvae in giant ragweed (Ambrosia trifida L.) (Hatchett et al. 1975); however, in soybean D. texanus larvae are known to be parasitized only by pteromalid wasps (Tindall, unpublished data) and a tachinid fly, Zelia tricolor (Coquillet) (Tindall & Fothergill 2010). Discovery of parasitoids of D. texanus larvae within soybeans offers opportunity for producers to manage for biological control within soybean production systems.

Soybean stems (i.e., stubble) were collected from a soybean field harvested in the fall of 2009 on 23 Mar 2010 in New Madrid County, Missouri (N 36.42482° W -89.64933°). From this set, 480 were selected based on the presence of a frass plug, an indicator of occupancy by D. texanus (Hatchett et al. 1975), and subsequently kept in an insect rearing room (16:8 h L:D, 24 °C). Five D. irritator were recovered from these stems (Table 2). Three additional individuals were found during other stubble-based D. texanus survey work from soybean stems from the same field (Table 2). The D. irritator specimens recovered were sent to the American Entomological Institute (Gainesville, Florida) for identification by Dr. David Wahl. Six of the specimens were retained by the American Entomological Institute collection and 2 are deposited in the collection of KVT. D. texanus as the insect host for these D. irritator is confirmed by:

1) the timing of stem harvest (Fothergill et al. 2010),
2) morphology of stem tunneling (Fothergill et al. 2010),
3) discovery of a D. texanus larva carcass in a soybean stem with a D. irritator larva (Table 2, specimen #6), and
4) emergence of only D. texanus and a pteromalid wasp (data not shown) from this cohort of soybeans.

This is, to our knowledge, the first documented case of D. irritator parasitizing D. texanus and using a host boring within an annual, herbaceous plant. It is likely that further research will find other insect hosts and plant associations utilized by D. irritator.

These records indicate that D. irritator can overwinter with D. texanus larvae in soybean stubble. The five D. irritator adults recovered from the above mentioned cohort of 480 soybean stubble, which contained overwintering D. texanus larvae, represent a field parasitism rate of 1%. Additional work is needed to determine the parasitism rate of D. irritator in other populations of soybean utilizing D. texanus and what role it may play in D. texanus population dynamics.

Dolichomitus irritator has been found visiting flowers of Salix discolor Muhl. (Graenicher 1900) (Malpighiales: Salicaeae) and the term: “Ichneumon flowers” (Knuth 1906) has been coined to describe flowers that attract Ichneumonoids and other similar insects. Bianchi et al. (2006) concluded that field margins and other non-crop habitats can enhance the abundance and diversity of natural enemy species within an agricul-
### Table 1. Previously Known Insect Hosts of Dolichomitus irritator and Associated Plants.

<table>
<thead>
<tr>
<th>Host Insect</th>
<th>Host Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family</strong></td>
<td><strong>Species</strong></td>
</tr>
<tr>
<td>Buprestidae</td>
<td>Chrysobothris sp.</td>
</tr>
</tbody>
</table>
| Cerambycidae | “Leptura” | Fagaceae | Quercus sp. | Townes and Townes 1960
| Cerambycidae | Anelaphus parallelus (Newman) | Fagaceae | Acer negundo L. | Chittenden 1893 |
| Cerambycidae | Astyleiopus variegatus (Hald.) | Aceraceae | Acer negundo L. | Townes and Townes 1960
| Cerambycidae | Elaphidion sp. | Fagaceae | Quercus sp. | Townes and Townes 1960
| Cerambycidae | Graphisurus fasciatus (DeGeer) | Fagaceae | Acer negundo L. | Townes and Townes 1960
| Cerambycidae | Megacyllene caryae (Drury) | Fagaceae | Quercus sp. | Townes and Townes 1960
| Cerambycidae | Megacyllene caryae (Drury) | Fabaceae | Robinia pseudoacacia L. | MacAndrews 1933 |
| Cerambycidae | Megacyllene robiae (Forster) | Oleaceae | Fraxinus sp. | Townes and Townes 1960
| Cerambycidae | Oarium rufulum Gahan | Oleaceae | Fraxinus sp. | Townes and Townes 1960
| Cerambycidae | Pachyla lamed (L.) | Urticaceae | Euphorbia sp. | Townes and Townes 1960
| Cerambycidae | Parelaphidion incertum (Newman) | Juglandaceae | Carya sp. | Townes and Townes 1960
| Cerambycidae | Rhagium inquisitor (L.) | Juglandaceae | Carya sp. | Townes and Townes 1960
| Cerambycidae | Saperda discoidea F. | Cerambycidae | Unknown | Townes and Townes 1960
| Cerambycidae | Trigonarthris proxima (Say) | Cerambycidae | Unknown | Chittenden 1893 |
| Cerambycidae | Unknown | Cerambycidae | Xylothereus annosus (Say) | Townes and Townes 1960
| Cermabidae | Anelaphus villosus (F.) | Fagaceae | Castanea dentata (Marsh.) Borkh. | Townes and Townes 1960
| Cermabidae | Anelaphus villosus (F.) | Fagaceae | Quercus sp. | Townes and Townes 1960
| Cercionidae | Cryptorynchus lapathi (L.) | Fagaceae | Fagus sp. | Chittenden 1904 |
| Cercionidae | Cryptorynchus lapathi (L.) | Fagaceae | Fagus sp. | Townes and Townes 1960
| Synchroidae | Synchroa punctata Newman | Fagaceae | Fagus sp. | Townes and Townes 1960
| Sesiidae | Synanathedu exotica Say | Rosaceae | Prunus persica (L.) Batsch. | Gossard and King 1918 |
| Sesiidae | Synanathedu tipuliformis (Clerck) | Ulmaceae | Elm | Townes and Townes 1960
| Unknown | Unknown | Ulmaceae | Elm | Zimmer 1909 |

1 Based on label data from collections.
Table 2. Dolichomitus irritator specimens reared from 2009 growing season soybean stubble inhabited by Dectes texanus and harvested from New Madrid County, Missouri.

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Stem harvest date</th>
<th>Discovery Date</th>
<th>Comment</th>
</tr>
</thead>
</table>

Summary

Dolichomitus irritator (Fabricius) was discovered utilizing Dectes texanus LeConte larvae as hosts within the previous year's soybean stubble in early spring in southeast Missouri. This represents the first records of D. irritator utilizing hosts within herbaceous plants and the first records of an Ichneumonid wasp parasitizing D. texanus in soybeans.

References Cited


Turetural landscape. These findings suggest it may be possible for soybean producers to manage non-crop habitats to attract and/or produce a source of natural enemies to aid in control of D. texanus. Further research may elucidate these processes and discover other parasites of D. texanus.