New report of Hoverfly parasite *Diplazon laetatorius* (Fabricius, 1781) (Ichneumonidae - Hymenoptera) from Iraq

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Abstract. The study has recorded the Hoverfly parasite *Diplazon laetatorius* (Fabricius, 1781) for the first time in Iraq. The material examined was from Karbala city, with coordinates 32.6068° N, 44.0104° E, 14.4.2019, 4 ♀. This ichneumonid wasp is imported for the biological control of pests. It is vital to increase awareness among Iraqi growers about the benefits of this ichneumonid wasp and probably included it in IPM.

1. Introduction

Natural enemies can effectively hinder outbreaks of crop pests and control their populations and have saved an estimated $80 billion worldwide in the prevention of damage to crops [1]. For example, *Diplazon laetatorius* is a cosmopolitan ichneumonid parasite that reproduces parthenogenetically, with females produced from non-fertilized eggs. Males are very rare and have only been reported in North America and India; the females, which are thelytokous, oviposit in either the egg as well as the first instar larva of host syrphids and new females later emerge from the syrphid pupa [2, 3]. This ichneumonid parasitises a wide range of Diptera (with about 50 host species recorded) and especially several genera of aphidophagous syrphid flies; most frequently, Sphaerophoria, Metasyrphus and Episyrphus [4]. *Diplazon laetatorius* has been recorded in Iran, Egypt, and Malta [5-8], but never before in Iraq. Therefore, the recently collected specimens are proven to represent a new record for Iraq, and some information on this species follows.
2. Materials and Methods
This study is based on the examination of materials collected from a greenhouse and farm in the city of Kerbala, Iraq, in March-May 2019. Specimens were preserved in the Entomology laboratory of the College of Agriculture at Kerbala University. Photos were taken using LabCam Pro for iPhone 6S attached to a stereoscope (Lieder). The specimens were examined according to the identification key to species of the subfamily Diplaxontinae as described in [7], [9]. The specimens were sent to Dr Gavin Broad in Natural History Museum London to confirm the species.

3. Results and Discussion
Four females were examined, and no male was found in the area of study. The taxonomic characteristics of female species such as mesonotum are showing notauli; aspect of propodeum (Fig. 1I), the hindleg tibia showed tri-coloured black-white-black-orange (Fig. 1E), metasoma with orange at least on most of tergites 2 and 3, the antenna with 16 flagellomeres (Fig. 1B). Antenna orange, brown dorsally. Head and mesosoma black, legs including coxae orange excluding hind tibia tricoloured, hindleg tarsus dark (Fig. 1G). According to the taxonomic characteristics above, the identification key was used with confirming from experts in Natura History Museum London. The results show that the specimens belong to the subfamily Diplazontinae (Viereck, 1918), and the genus Diplazon Nees, 1818. When the morphological aspects shown in Figure 1 were examined, these were considered to match those of Diplazon laetatorius (Fabricius, 1781). This species is reported for the first time from Iraq-Karbala. The ichneumonid wasp D. laetatorius has been shown on syrphus, whitefly, and Lepidoptera larva.

3.1 Classification of species
Kingdom: Animalia, Phylum: Arthropoda, Class: Insecta, Order: Hymenoptera, Super Family: Ichneumonidea, Family: Ichneumonidae, Subfamily: Diplazontinae, Genera: Diplazon, Species: laetatorius.

3.2 General distribution of this species
Diplazon laetatorius can be found in Afghanistan, Albania, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Brazil, Bulgaria, Burundi, Canada, Chile, China, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Egypt, Estonia, Ethiopia, Fiji, Finland, France, Germany, Greece, Guam, Guatemala, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Korea, Latvia, Libya, Lithuania, Luxembourg, Madagascar, Mexico, Moldova, Mongolia, Netherlands, New Zealand, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Réunion, Senegal, Serbia & Montenegro, South Africa, Spain, Sudan, Sweden, Switzerland, Tajikistan, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Kingdom, Uruguay, USA, Uzbekistan, Zambia, Zimbabwe, and previously unrecorded from Karbala, Iraq [5, 7, 8].

3.3 Host records
It has been reported as associated with a wide range of insect hosts belonging to the families Chrysomelidae and Curculionidae (Coleoptera), Depressariidae, Tortricidae, Pyralidae, Noctuidae, Plutellidae, and Gelechiidae (Lepidoptera), Syrphidae and Muscidae (Diptera), Pteromalidae, Diprionidae, and Pamphiliidae (Hymenoptera), and Aphididae (Hemiptera) [5, 7, 8].
4. Conclusion
In this study the Hoverfly parasite Diplazon laetatorius (Fabricius, 1781) has been reported for the first time in Iraq. This ichneumonid wasp can contribute in the biological control of pests that are common in Iraq. Thus, it is essential to increase the knowledge among Iraqi growers about the advantages of employing this ichneumonid wasp with possibility including it in IPM of Iraqi pests.

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