

OCCURRENCE AND DAMAGES IN RICE CAUSED BY THE RICE WATER WEEVIL *LISSORHOPTRUS ORYZOPHILUS* KUSCHEL (COLEOPTERA: CURCULIONIDAE)

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Abstract

The rice water weevil *Lissorhoptrus oryzophilus* Kuschel (Coleoptera: Curculionidae) is an important and destructive pest of rice. Comes from the United States of America and remained confined to North America until 1976, when it was spread to Asia. In Europe, it was first detected in Italy in 2004, and in 2016 it was also observed in Greece. Throughout 2023, during the control of the rice fields in the Kochani region, Republic of North Macedonia, rice damages similar to that caused by the rice weevil were observed. The presence of the pest was established after a detailed examination. The identity of the pest was determined through the morphological characteristics of the imago. Damages to the rice plants were both on the roots and the leaves. Further researches should be carried out to determine the prevalence of the pest, its abundance, the damage it causes and the protective measures need to be taken.

Key words: Rice weevil, *Oryza sativa*, occurrence, damages, pests.

Introduction

The rice water weevil, *L. oryzophilus* Kuschel, (Coleoptera: Curculionidae) is a semi-aquatic beetle that is considered one of the most important rice pests globally (Tindall et al., 2013). *L. oryzophilus* is also described as a highly invasive species on account of its spreading capability by air, flying, swimming or human mediated hitchhiking as well as its diverse feeding behavior (wide range of wild grasses) and adaptive overwintering tactics (wide range of overwintering substrates such as bunchgrass and leaf litter) (Chen et al. 2005; Adams et al. 2015). It is also worth noting that due to its parthenogenetic reproduction, a single individual is in theory sufficient to establish a new infestation (Saito et al. 2005). In China, it is characterized as the most important invasive insect species (Chen et al. 2005).

The rice water weevil, *L. oryzophilus* is native to the Northern USA. During the second half of the twentieth century, it has invaded several productive rice-growing areas throughout the world, including South USA, Japan, China, India, South and North Korea (Lupi et al. 2015). More recently, in 2004, it was reported for the first time as an invasive pest in Italy (Caldara et al. 2004; Lupi et al. 2010), being the sole European or Mediterranean region where it has so far been detected (Lupi et al. 2015). In 2016 its presence was confirmed in the rice fields of the Western part of Thessaloniki, Greece (Ioannis et al. 2017).

Material and methods

Throughout 2023, during the control of the rice fields in the Kochani region, Republic of North Macedonia, rice damages similar to that caused by the rice weevil were observed. After a detailed examination of the rice field, we established the presence of the pest. The identity of the pest was determined through the morphological characteristics of the imago. A total of 10 *L. oryzophilus* specimens were collected throughout the survey period and were morphologically identified according to the description provided by Kuschel (1952) and O'Brien and Haseeb (2014).

Results and discussion

No differences were observed in the external morphological characteristics of the collected rice water weevils compared to those described in the literature. Adult specimens were small, approximately 2.5 to 3.5 mm long, grayish in color with an elongated dark brown mark along the center of the elytra (Fig. 1). Damages to the rice plants were both on the roots and the leaves (Fig. 2). Adult weevils feed on the upper leaf surfaces leaving a longitudinal scar on the leaves, while larvae feed on the roots reducing the root system to the extent that plants can be easily uprooted by the wind (Chen et al. 2005; Saito et al. 2005). The larval feeding is primarily responsible for the yield and economic losses in rice production (Zou et al. 2004), which typically exceed 10% when no control treatments are available (Tindall et al. 2013) and can reach up to 25–30% (Zou et al. 2004; Saito et al. 2005). Pest management strategies for the control of the rice water weevil populations rely on the use of various insecticides such as pyrethroids and neonicotinoids, some promising alternative biological control techniques using entomopathogenic bacteria such as *Bacillus thuringiensis* or with appropriate weed management strategies (Adams et al. 2015; Aghaee and Godfrey, 2015).

Conclusion

To the best of our knowledge, this is the first report of *L. oryzophilus* in the Republic of North Macedonia, comprising a serious challenge for rice production that deserves special attention, particularly in the Kocani region and all neighboring rice cultivation areas. Further researches should be carried out to determine the prevalence of the pest, its abundance, the damage it causes and the protective measures need to be taken.



Fig.1. Rice water weevil *Lissorhoptrus oryzophilus* Kuschel



Fig.2. Damages to the rice plants caused by the rice water weevil

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