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SHORT COMMUNICATION

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Wild olive seed weevil, *Anchonocranus oleae* Marshall (Coleoptera: Curculionidae), in cultivated olives in South Africa

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Wild olive seed weevil, *Anchonocranus oleae* Marshall, larvae as well as oviposition and feeding damage were recorded in cultivated olives during a recent study on olive seed wasps in South Africa. Prematurely dropped fruit and fruit picked at harvest in two orchards near Stellenbosch and Agter-Paarl were examined regularly for olive seed wasp infestation over three seasons. In addition, olives were collected over a wider area of the olive growing regions of the Western Cape province for a survey to determine olive seed wasp distribution. DNA barcoding confirmed the identity of weevil larvae in kernels as *A. oleae*. The number of *A. oleae* larvae found in olive seeds and the number of olives with weevil oviposition or feeding damage were low. The presence of larvae and weevil damage in two orchards in the survey with no wild olive trees in close proximity suggest that the weevil could breed and persist in cultivated olive orchards. Currently *A. oleae* is not of economic concern, but if infested olives are discarded at harvest and left in orchards, the weevils could complete their development in the kernels and numbers could increase to damaging levels.

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The wild olive seed weevil, *Anchonocranus oleae* Marshall (Coleoptera: Curculionidae), was first described by Marshall in 1912 from two specimens reared from wild olives collected by Silvestri at undisclosed locations in South Africa (Marshall 1912) (Figure 1). Silvestri (1915) described larvae collected from wild olives in Wellington (Western Cape province) and an unspecified location in what is now Gauteng province. He recorded that *A. oleae* feeds on the seed of the African wild olive, *Olea europaea* L. subsp. *cuspidata* (Wall. & G. Don) Cif. Subsequent surveys and studies on olive pests did not record the presence of this weevil in wild or cultivated olives (*Olea europaea* subsp. *europaea*) (Neuenschwander 1982; Mkize et al. 2008). However, according to Smit et al. (2022), collection records and specimens curated in the Iziko Museum in Cape Town, the University of Naples in Portici, Italy, and the South African National Collection of Insects in Pretoria confirm that *A. oleae* is widespread in wild olives in South Africa. Caleca et al. (2019) identified *A. oleae* in wild olives from various localities in the Western Cape province and reported on laboratory observations showing that *A. oleae* adults readily fed on wild olive pulp but refused to feed on cultivated olives. They ascribed the small number of *A. oleae* larvae found in cultivated olives growing close to wild olive trees to a spill over event whereby female weevils were compelled to lay eggs in the cultivated olives because the prevailing drought at the time resulted in wild olive trees bearing almost no fruit. Caleca et al. (2019) concluded that the olive seed weevil, *A. oleae*, is not an economically damaging pest of cultivated olives in South Africa. Here we report on the occurrence of *A. oleae* in cultivated olives during a recent study investigating olive seed wasps (*Eupelmus spermophilus* Silvestri) in cultivated olives (Allsopp et al. 2021).

The methodology for collecting and examining cultivated olives for olive seed wasp infestation was described in detail in Allsopp et al. (2021). In short, large numbers of olives that had dropped prematurely were collected over three seasons in two olive orchards and examined for the presence of olive seed wasps together with fruit picked from the trees at harvest. Fruits without olive seed wasp exit holes were cut open to determine potential infestation. The orchards were located near Agter-Paarl (33°41′4.01″S 18°54′4.4″E) and near Stellenbosch (34°0′3.73″S 18°52′18.42″E). In Agter-Paarl, Frantoio olives were sampled and near Stellenbosch a mixture of Mission, Frantoio and Leccino olives was sampled. At both sites, African wild olives grew in close proximity to the orchards. During the examination of these olives for the presence of olive seed wasps, *A. oleae* larvae and the number of olives with weevil oviposition damage (Figure 2) or feeding damage were recorded (Table 1). Olives were also collected in all the olive-growing areas in the Western Cape between 2016 and 2018 to determine olive seed wasp distribution. The number of olives with *A. oleae* larvae and weevil damage was recorded, but the type of damage (oviposition, feeding or exit holes) was not specifically recorded (Table 2). The identity of larvae was confirmed through DNA barcoding (Smit et al. 2022). DNA barcodes were deposited on GenBank under the accession numbers ON504300–ON504321. Whole larvae were used for DNA extraction, but an adult, from which only a hind leg was used, was deposited in the insect collection of the Iziko Museums of South Africa in Cape Town with the coden SAM-COL-A082796 (Smit et al. 2022).

Since the aim of the study was to investigate olive seed wasp occurrence, sampling sites and olives sampled directly from trees during the surveys were not selected based on signs of weevil damage nor presence. In spite of this, weevil larvae and/or olives with oviposition damage were

Figure 1. *Anchonocranus oleae* adult.

Table 1. Occurrence of *Anchonocranus oleae* larvae and the incidence of olives with weevil oviposition and feeding damage in cultivated olives sampled over three seasons (2016, 2017 and 2018) near Agter-Paarl and Stellenbosch

Location	Season	Total no. olives examined	No. cut olives with weevil larvae	No. uncut olives with weevil damage*
Stellenbosch	2016**	2 071	0**	1 ov
	2017	11 941	23	1 f
	2018	3 179	4	0
Agter-Paarl	2016**	10 712	0**	98 ov
	2017	4 999	8	0
	2018	777	7	0

*Number of uncut olives with weevil oviposition (ov) or feeding (f) damage.
**During the 2016 season no olives were cut open to look for larvae inside the kernels.

Table 2. Occurrence of *Anchonocranus oleae* larvae and the incidence of olives with weevil oviposition and feeding damage or exit holes in cultivated olives surveyed over three seasons (2016, 2017 and 2018) in the Western Cape province

Location	Season	Cultivar	Total no. olives examined	No. cut olives with weevil larvae*	No. uncut olives with weevil damage**
Porterville	2016*	Mission	100	–	1
Riebeeck-Kasteel 1		Mission	100	–	1
Riebeeck-Kasteel 2		Frantoio	100	–	2
Montagu 1		Frantoio	150	–	20
Montagu 2		Frantoio	200	–	2
Robertson		Frantoio	100	–	1
		Mission	300	–	25
McGregor		Mission	100	–	1
Porterville	2017	Kalamata	73	2	0
De Rust		Leccino	123	1	0
Tulbagh		Koroneiki	146	1	0
Tulbagh	2018	F(VB)41	156	0	4
		Frantoio	68	0	2

*During the 2016 survey no olives were cut open to look for larvae inside the kernels.
**Number of olives with weevil oviposition or feeding damage or exit holes. Type of damage not specifically recorded.

found in cultivated olives, albeit mostly in low numbers, in both the Agter-Paarl and Stellenbosch orchards (Table 1), as well as in all of the growing regions surveyed over three seasons (Table 2). The highest number of weevil damaged olives were found in orchards in Montagu (cv. Frantoio) and Robertson (cv. Mission) where there were no wild olives growing close to the orchards (Table 2). This suggests that olive seed weevils can breed and persist in cultivated olive orchards, and that their presence in cultivated olives is not just the result of sporadic incursions due to the absence of wild olive fruits. This is supported by the observation by Caleca et al. (2019) that adult *A. oleae* were reluctant to fly, although they have fully formed metathoracic wings. It is therefore unlikely that adult weevils emerging in an orchard would fly long distances to find wild olives rather than utilise the cultivated olives.

According to Caleca et al. (2019), female weevils use their mandibles to make a hole in the pulp of the fruit to reach the kernel, and after laying a single egg in this hole, the hole is plugged with black faeces (Figure 2). The young weevil larvae pierce the kernel to feed on the seed. It is not known how long it takes before the larvae pupate, but mature larvae in the laboratory were still alive after a year without pupating or any signs of becoming pupae. Emerging adult weevils chew holes through the pulp to escape, leaving clearly visible exit holes (Figure 3). Caleca et al. (2019) speculated that this delay in development and adult emergence could be an evolutionary adaptation to wild olives not necessarily being available every year since wild olive trees often do not bear fruit during drought years. This could explain the absence of adult *A. oleae* in surveys involving a large amount of collected fruit, such as that of Mkize et al. (2008), where wild olives were kept in emergence boxes but discarded once they became hard and desiccated.

This is the first report to confirm that *A. oleae* utilises cultivated olives as a host plant and can persist in orchards in all of the olive production regions surveyed in the Western Cape province. Currently, olive seed weevil numbers in cultivated olives are low enough not to be of economic concern, but this could change. Oviposition sites and exit holes are easily visible and such damaged olives will be discarded at harvest and most likely just left on the ground. Bearing in mind that olive seedweevil larvae can continue to develop in the kernels where

Figure 2. Oviposition damage by the olive seed weevil *A. oleae* on wild olives

Figure 3. Exit holes of the olive seed weevil *A. oleae* in wild olives

they feed on the seeds even when the fruit pulp has dried out, it is important that discarded fruit not be left in orchards. It would be better to remove and crush the fruit and kernels to prevent a gradual build-up of weevils in olive orchards, which could reach economically damaging levels over time. Since *A. oleae* does not occur in any other olive producing countries, no methods of control are known.

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