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An agricultural practice as a direct threat to the snake-eyed skink *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) in central Greece

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Abstract

Terrestrial reptiles are threatened by numerous anthropogenic activities, including agriculture. Many agricultural methods and techniques affect the herpetofauna located in the oldest known tree crops in the Mediterranean Basin, olive trees. For the first time, we present a case of unintentional capture (and killing) of 12 snake-eyed skinks *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) on an insect control sticky trap in an olive grove in central Greece.

Key Words

agriculture, lizard, Mediterranean, olive grove, sticky traps, threat

Agriculture represents one of the most common threats to terrestrial reptiles (74% of threatened reptilian species affected) on a global level (Böhm et al. 2013). In the case of lizards, agricultural methods, such as pesticides or insecticides, have been reported to severely affect lizards' populations (DuRant et al. 2007; Amaral et al. 2012). Olive tree cultivation, one of the oldest known tree crops in the Mediterranean Basin (Loumou and Giourga 2003; Connor 2005), is not an exception. Most of the Mediterranean countries maintain a considerable amount of olive tree cultivations to produce either olive oil or edible olives. Though olive groves are not considered a fragile type of cultivation, they do suffer from certain pests. Amongst the latter, the olive fruit fly *Bactrocera oleae* (Rossi, 1790) stands out. To control this particular insect, but also other pests, several methods have been developed, including the sterile insect technique, alternative natural phytosanitary insecticides, particularly organophosphates, hydrolyzate protein solution and pheromones and sticky traps (Mazomenos et al. 2002; Skouras et al. 2007).

Sticky traps are known from both agriculture and also scientific research. They are hung from tree branches or directly attached on tree trunks to trap insects (and other animals) on their sticky surface. Thanks to their efficiency, low cost and ease of setting up, they quickly become an effective and widely-used tool to trap insects. As sticky traps can effectively capture lizards as well, they are, therefore, also used in herpetological studies (Glor et al. 2001; Ribeiro-Júnior et al. 2006, 2008). Here, we report a case of unintentional lizard capture (and killing) in an olive grove in central Greece.

On 1 June 2019, a sunny day with average temperature of 28 °C, we made a herpetological excursion to the Spercheios River valley (Fthiotida, central Greece; 38.9022°N, 22.2775°E). While searching for reptiles in an olive grove (elevation 65 m), we spotted a sticky trap in the ground that had fallen from an olive tree where

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Figure 1. A. A sticky trap in use, hung from a tree; **B.** The first sticky trap found on the ground with a trapped dead adult *Ablepharus kitaibelii* (notice the arrow).

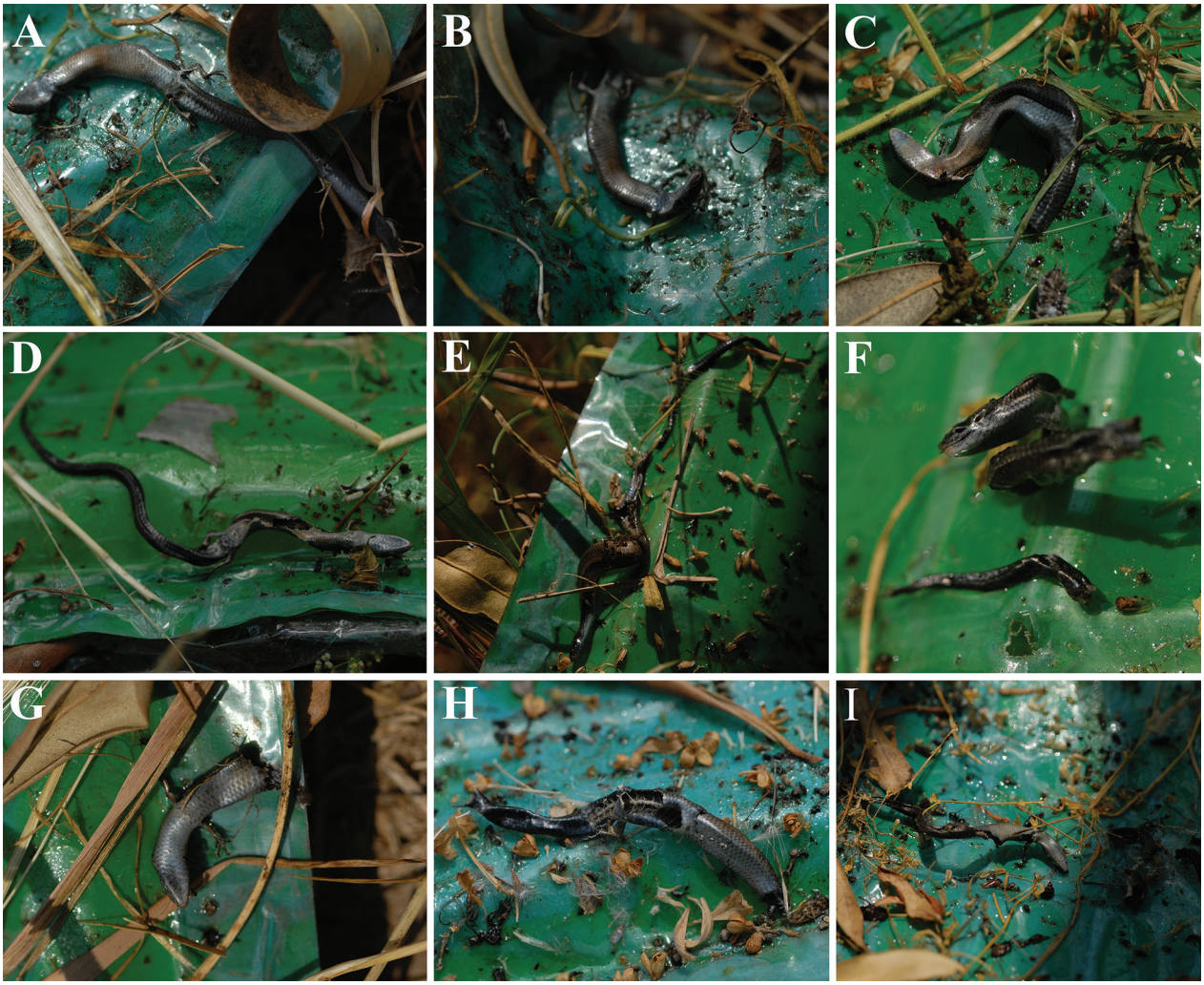

Figure 2. (**A.–I.**) Dead individuals of *Ablepharus kitaibelii* on several sticky traps.

more traps were still in place, hanging from the tree branches (Fig. 1A). To our surprise, a snake-eyed skink *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) already dead, was found stuck to the underside of the trap (Fig. 1B). During our stay in the olive grove, we spotted a total of 11 sticky traps which had fallen from the olive trees. In eight of them, we encountered 12 dead adults *A. kitaibelii*: six individuals were found on two traps and one individual was found on each one of the other six traps (Fig. 2A–I).

The snake-eyed skink is a small terrestrial lizard that lives on the ground hiding in dense grass vegetation, incapable of climbing trees (Herczeg et al. 2007; Valakos et al. 2008). It is a common species in olive groves and, as it ranges throughout Greece, including most of the islands (Valakos et al. 2008), sticky traps in olive trees represent a serious danger. Most probably some individuals ended up on the sticky traps after the traps had fallen on the ground. It is hard to tell whether the skinks were attracted by the trapped insects or they sought shelter under the fallen sticky traps. In either case, they were captured on the sticky surface and, eventually, died.

To the best of our knowledge, this is the first report of dead lizard individuals due to insect control sticky traps used in olive groves. The number of our observations indicates that these lizard-killing incidents may be common in olive groves. In Greece, olive groves occupy some 887,000 hectares (second largest olive grove area after Spain in the European Union). Approximately 10,650,000 hectares of olive groves are cultivated worldwide (FAOSTAT 2016). In other words, many small-bodied lizards, like *A. kitaibelii* or geckos that climb on olive tree trunks, like *Mediodactylus kotschyi* (Steindachner, 1870) (Swartz et al. 2016; Pafilis et al. 2020) or even juveniles of other larger lizards, are potentially jeopardised by this practice. Interestingly, in this case, we found exclusively *A. kitaibelii* and no other lizard that also dwells in the area. More systematic research on the topic that will include other olive-producing countries and more lizard species could show the exact scale and the extent of this problem. As a first step, farmers should regularly check that sticky traps remain on the trees and immediately collect traps from the ground.

References

Amaral MJ, Bicho RC, Carretero MA, Sanchez-Hernandez JC, Faustino AM, Soares AM, Mann RM (2012) The use of a lacertid lizard as a model for reptile ecotoxicology studies: Part 2– Biomarkers of exposure and toxicity among pesticide exposed lizards. Chemosphere 87(7): 765–774. https://doi.org/10.1016/j.chemosphere.2012.01.048

Böhm M, Collen B, Baillie JEM, Bowles P, Chanson J, Cox N, Hammerson G, Hoffmann M, Livingstone SR, Ram M, Rhodin AGJ, Stuart SN, van Dijk PP, Young BE, Afuang LE, Aghasyan A, García A, Aguilar C, Ajtic R, Akarsu F, Alencar LRV, Allison A, Ananjeva N, Anderson S, Andrén C, Ariano-Sánchez D, Arredondo JC, Auliya M, Austin CC, Avci A, Baker PJ, Barreto-Lima AF, Barrio-Amorós CL, Basu D, Bates MF, Batistella A, Bauer A, Bennett D, Böhme W, Broadley D, Brown R, Burgess J, Captain A, Carreira S, Castañeda MDR, Castro F, Catenazzi A, Cedeño-Vázquez JR, Chapple DG, Cheylan M, Cisneros-Heredia DF, Cogalniceanu D, Cogger H, Corti C, Costa GC, Couper PJ, Courtney T, Crnobrnja-Isailovic J, Crochet P-A, Crother B, Cruz F, Daltry JC, Daniels RJR, Das I, de Silva A, Diesmos AC, Dirksen L, Doan TM, Dodd CK, Doody JS, Dorcas ME, Duarte de Barros Filho J, Egan VT, El Mouden EH, Embert D, Espinoza RE, Fallabrino A, Feng X, Feng Z-J, Fitzgerald L, Flores-Villela O, França FGR, Frost D, Gadsden H, Gamble T, Ganesh SR, Garcia MA, García-Pérez JE, Gatus J, Gaulke M, Geniez P, Georges A, Gerlach J, Goldberg S, Gonzalez J-CT, Gower DJ, Grant T, Greenbaum E, Grieco C, Guo P, Hamilton AM, Hare K, Hedges SB, Heideman N, Hilton-Taylor C, Hitchmough R, Hollingsworth B, Hutchinson M, Ineich I, Iverson J, Jaksic FM, Jenkins R, Joger U, Jose R, Kaska Y, Kaya U, Keogh JS, Köhler G, Kuchling G, Kumlutaş Y, Kwet A, La Marca E, Lamar W, Lane A, Lardner B, Latta C, Latta G, Lau M, Lavin P, Lawson D, Le Breton M, Lehr E, Limpus D, Lipczynski N, Lobo AS, López-Luna MA, Luiselli L, Lukoschek V, Lundberg M, Lymberakis P, Macey R, Magnusson WE, Mahler DL, Malhotra A, Mariaux J, Maritz B, Marques OAV, Márquez R, Martins M, Masterson G, Mateo JA, Mathew R, Mathews N, Mayer G, McCranie JR, Measey GJ, Mendoza-Quijano F, Menegon M, Métrailler S, Milton DA, Montgomery C, Morato SAA, Mott T, Muñoz-Alonso A, Murphy J, Nguyen TQ, Nilson G, Nogueira C, Núñez H, Orlov N, Ota H, Ottenwalder J, Papenfuss T, Pasachnik S, Passos P, Pauwels OSG, Pérez-Buitrago N, Pérez-Mellado V, Pianka ER, Pleguezuelos J, Pollock C, Ponce-Campos P, Powell R, Pupin F, Quintero-Díaz GE, Radder R, Ramer J, Rasmussen AR, Raxworthy C, Reynolds R, Richman N, Rico EL, Riservato E, Rivas G, da Rocha PLB, Rödel M-O, Rodríguez Schettino L, Roosenburg WM, Ross JP, Sadek R, Sanders K, Santos-Barrera G, Schleich HH, Schmidt BR, Schmitz A, Sharifi M, Shea G, Shi H-T, Shine R, Sindaco R, Slimani T, Somaweera R, Spawls S, Stafford P, Stuebing R, Sweet S, Sy E, Temple HJ, Tognelli MF, Tolley K, Tolson PJ, Tuniyev B, Tuniyev S, Üzüm N, van Buurt G, Van Sluys M, Velasco A, Vences M, Veselý M, Vinke S, Vinke T, Vogel G, Vogrin M, Vogt RC, Wearn OR, Werner YL, Whiting MJ, Wiewandt T, Wilkinson J, Wilson B, Wren S, Zamin T, Zhou K, Zug G (2013) The conservation status of the world's reptiles. Biological Conservation 157: 372–385. https://doi.org/10.1016/j.biocon.2012.07.015

Connor DJ (2005) Adaptation of olive (*Olea europaea* L.) to water-limited environments. Australian Journal of Agricultural Research 56(11): 1181–1189. https://doi.org/10.1071/AR05169

DuRant SE, Hopkins WA, Talent LG (2007) Impaired terrestrial and arboreal locomotor performance in the western fence lizard (*Sceloporus occidentalis*) after exposure to an AChE-inhibiting pesticide. Environmental Pollution 149(1): 18–24. https://doi.org/10.1016/j.envpol.2006.12.025

FAOSTAT [Food and Agriculture Organization of the United Nations] (2016) EU olive oil farms report. http://www.fao.org/family-farming/detail/en/c/326556/ [Accessed on 10 December 2020]

Glor RE, Flecker AS, Benard MF, Power AG (2001): Lizard diversity and agricultural disturbance in a Caribbean forest landscape. Biodiversity and Conservation 10(5) 711–723. https://doi.org/10.1023/A:1016665011087

Herczeg G, Kovács T, Korsós Z, Török J (2007) Microhabitat use, seasonal activity and diet of the snake-eyed skink (*Ablepharus kitaibelii fitzingeri*) in comparison with sympatric

lacertids in Hungary. Biologia 62(4): 482–487. https://doi.org/10.2478/s11756-007-0092-6

Loumou A, Giourga C (2003) Olive groves: "The life and identity of the Mediterranean". Agriculture and Human Values 20(1): 87–95. https://doi.org/10.1023/A:1022444005336

Mazomenos BE, Pantazi-Mazomenou A, Stefanou D (2002) Attract and kill of the olive fruit fly *Bactrocera oleae* in Greece as a part of an integrated control system. International Organization for Biological Control West Palaearctic Regional Section Bulletin 25(9): 137–146.

Pafilis P, Triantis K, Anastasiou I, Proios K, Valakos ED (2020) A Gecko archipelago: a herpetological survey on Lichadonissia, a small islet group in Greece. Herpetology Notes 13: 25–28.

Ribeiro-Júnior MA, Gardner TA, Ávila-Pires TCS (2006) The effectiveness of glue traps to sample lizards in a tropical rainforest. South American Journal of Herpetology 1(2): 131–137. https://doi.org/10.2994/1808-9798(2006)1[131:TEOGTT]2.0.CO;2

Ribeiro-Júnior MA, Gardner TA, Ávila-Pires TCS (2008) Evaluating the effectiveness of herpetofaunal sampling techniques across a gradient of habitat change in a tropical forest landscape. Journal of Herpetology 42(4): 733–749. https://doi.org/10.1670/07-097R3.1

Schwarz R, Gavriilidi I, Itescu Y, Sagonas K, Jamison S, Meiri S, Pafilis P (2016) *Mediodactylus kotschyi* in the Peloponnese peninsula, Greece: distribution and habitat. Acta Herpetologica 11(2): 179–187. https://doi.org/10.13128/Acta_Herpetol-18176

Skouras PJ, Margaritopoulos JT, Seraphides NA, Ioannides IM, Kakani EG, Mathiopoulos KD, Tsitsipis JA (2007) Organophosphate resistance in olive fruit fly, *Bactrocera oleae*, populations in Greece and Cyprus. Pest Management Science: formerly Pesticide Science 63(1): 42–48. https://doi.org/10.1002/ps.1306

Valakos ED, Pafilis P, Lymberakis P, Maragou P, Sotiropoulos K, Foufopoulos J (2008) The amphibians and reptiles of Greece. Edition Chimaira, Frankfurt, 463 pp.

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