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Pelophylax synklepton *hispanicus* (Bonaparte, 1839) on the branches of a tree: description of an unusual behaviour

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Green frogs occurring on Central and Southern Italian peninsula (Sicily, islands of Elba and Giglio included), south to an imaginary line that joins Genoa and Rimini, belong to an hybridogenetic complex composed by a parental species (*Pelophylax bergeri* [Guenther, 1986]) and its hemiclonal hybrid, *P.* kl. *hispanicus* (Bonaparte, 1839), often in mixed colonies (Andreone et al., 2009; Günther and Plötner, 1995; Uzzell and Hotz, 1979). Despite the specific epithet *"hispanicus*", this kleptospecies does not occur in Spain and it is endemic to Italy (Capula, 2006). Currently *P. hispanicus* and *P. bergeri* are morphologically almost indistinguishable, differently from what happens for *P. lessonae* (Camerano, 1882 "1881") and *P.* kl. *esculentus* (Linnaeus, 1758) (Lapini, Capula and Filippucci, 2007). We refer to the observed individuals by calling them Italian edible frogs (hereafter, IEF). IEFs are quite widespread all over the Tuscany (Piazzini, Favilli and Manganelli, 2005; Vanni and Nistri, 2006) and both the hybrid and the non-hybrid form can be found in a variety of aquatic environments (rivers, swamps, lakes, marshes), mostly located in open areas (cultivated field) and woodlands (up to 1400 m a.s.l.: Piazzini, Favilli and Manganelli, 2005). IEFs carry out their activities both during the day and the night, especially in the late spring and summer (Lanza et al., 2007), although they may be active all over the year, depending on environmental temperature (Piazzini, Favilli and Manganelli, 2005; Lanza et al., 2007). They feed on a high variety of aquatic and terrestrial invertebrates and smaller Amphibians (sometimes conspecific tadpoles), which are catched in the ponds or in their immediate surroundings. Some juveniles has been reported to gather food on small bushes (max. 50 cm above the ground: Günther, 1990); however their stocky body line and the absence of discs on the toes, that characterize species of the genus *Hyla,* do not allow IEFs to climb higher trees.

In this report, we document for the first time in the genus *Pelophylax* the presence of some individuals feeding on olive branches at 170 cm above the ground.

The study area is included in a proposed Site of Community Importance (pSCI; Regional Law 56/2000) of about 1062 hectares around the village of Prata (Grosseto, Tuscany, Central Italy), between 618 and 1060 m a.s.l., in the Metalliferous Hills (see Cantini et al., 2013). An artificial pool (0.8×0.8×0.45 m), located in a private vegetable garden, collects rainwater and is inhabited by at least five Amphibian species (Mori and Giovani, 2012). In its proximate nearby, a fig tree (*Ficus carica*) and an olive (*Olea europaea*) are present, respectively at 0.3 m and 4.65 m.

For two consecutive years (2011-2012), at the start of September, when daylight gets shorter and average daily temperature starts to decrease and, a group (one to eight) of adult and subadult IEFs, individually distinguished according to their dorsal patterns when caught in the

Table 1. Number of individuals observed at each date and at each altitude on the olive's branches.

Date	height of the branch (cm)			
	139	143	147	148
06-09-11	1	1	0	0
07-09-11	3	3	2	0
08-09-11	2	3	0	1
09-09-11	2	0	1	1
10-09-11	1	2	0	1
08-09-12	1	0	0	0
09-09-12	0	1	1	0
10-09-12	3	3	1	0
11-09-12	3	1	1	0
12-09-12	0	2	1	0
13-09-12	1	0	0	0

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pool, was observed moving clumsily on the branches of the olive (Table 1). While on the branches, individual recognition was impossible, as the frogs jumped down toward the pool when the observer came closer to the tree. Records of this peculiar behaviour were all concentrated at the sunset (hour: 19:00-19:30), while during the day and the night frogs stayed in the pool or foraged on the surrounding ground (Fig. 1A, 1B). IEFs were never observed on the branches of the fig tree.

Adult IEFs can not climb up to such a height, because of their stocky and heavy body structure. We improved our observations and we discovered that frogs reached the branches through a pair of plastic tanks (1.12 m high), which top is just 27 cm from the bifurcation of the branches where frogs were recorded (Fig. 1). The tanks have been climbed through a wooden board inclined at about 30 degrees, where frogs usually sunbasked. When above the branches, IEFs usually displayed sunbasking and/or feeding activities.

We excluded that this phenomenon mayd be an anti-predatory strategy, because being concentrated in a very short period of the year and because a camera-trapping and bird observation project (E. Mori, unpublished) revealed that the same predator species (e.g. domestic cats, polecats and raptors) are present all over the year. Moreover, branches expose IEFs much more to terrestrial and aerial predators (e.g. raptors) with respect to the ground and the pool, as their body structure limited escape success and rapid shelter achievement under the water surface.

Inter-specific competition is also to be excluded, as IEFs represent the only amphibians in the pool in September. Sunbasking on the wooden board is not recorded during the summer and is concentrated just at the start of September, when daily average temperature decreases, possibly because the board is south-facing.

A strict correlation between the phenomenon and the flicker of some ant species above these branches

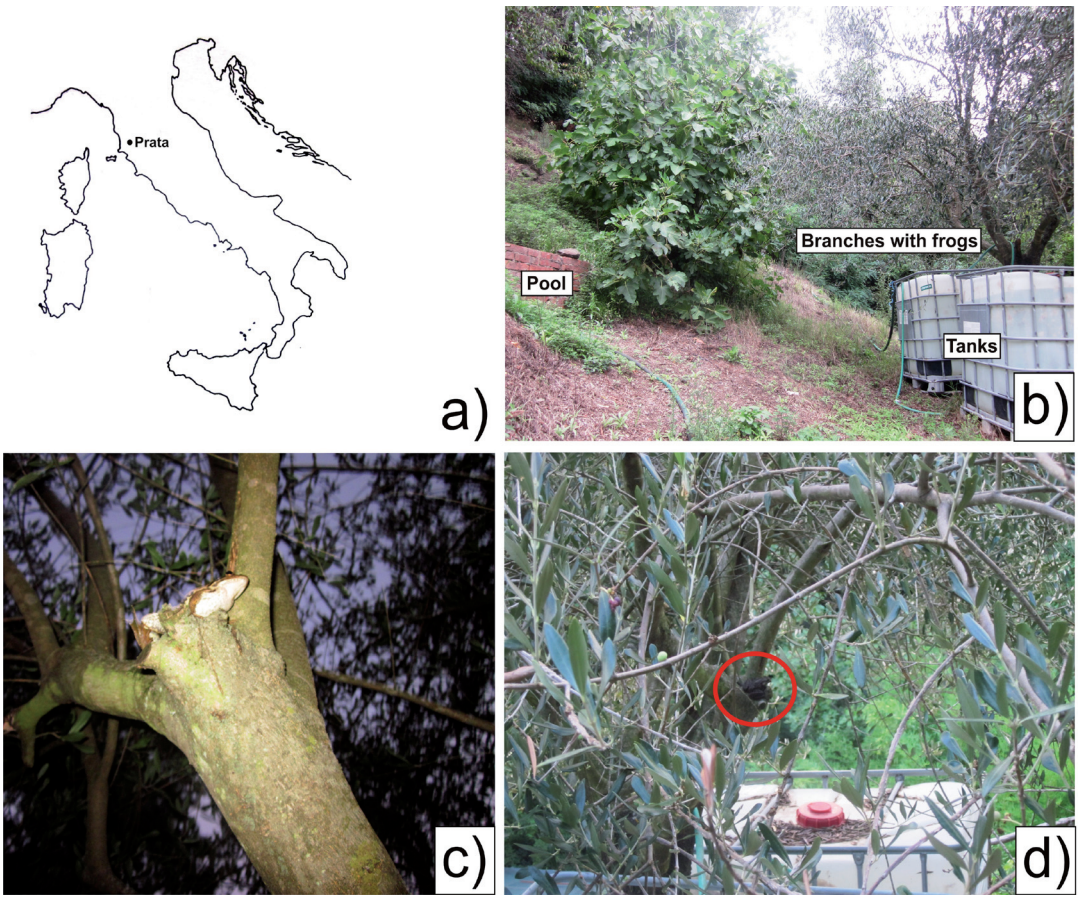

Figure 1. Location (A) and description (B) of the study area. Adult IEFs on the bifurcation of the branches (C and D).

(*Solenopsis fugax*) has been observed. Even if aquatic macroinvertebrates (e.g. *Velia rivulorum*, *Notonecta glauca*, *Libellula depressa, Aeshna* sp., *Dytiscus* sp.) of the pool may constitute the staple of the diet of the frogs all over the year, Hymenoptera are known to represent an important food supply for many amphibians species (e.g. Rubin, 1969; Clarke, 1974; Toft, 1980; Yu et al., 2009) and green frogs too (e.g. Sas et al., 2009; Lanza et al., 2007; Paunović, Bjelić-Ćabrilo and Šimić, 2010).

It is important to note that IEFs did not climb directly the tree but used an adjacent plastic tank to reach the branches. In other sites located within the same study areas, but without structures favoring the frog climbing, frogs never used branches surrounding the pool for feeding purposes. So, this unusual behaviour may be considered similar to what described for species belonging to the genus *Rana*, which sometimes use overhead structures around their breeding or wintering sites. For instances, in caves, specimens of *Rana* sp. can climb walls of 1-2 meters and stay in such rocky places, with wide viewpoints on the surrounding environment (Gonçalo and Penado, 2013; pers. obs.).

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