

Short note

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First record of the raccoon dog *Nyctereutes procyonoides* (Gray, 1834) in Luxembourg

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Between 1929 and 1955, more than 9000 raccoon dogs *Nyctereutes procyonoides* (Gray, 1834) were introduced from their native range in southeast Siberia into the European parts of the former USSR (today: Belarus, Latvia, European part of Russia, and Ukraine) for hunting purposes [1][2]. From there, the species rapidly spread westwards, and by 1998, it was widely distributed in Finland, Lithuania, Latvia, Estonia, Poland, the Czech Republic, Slovakia, Bulgaria and Germany [1][2]. It was more sporadically present in Austria, Hungary, Romania and Serbia [1][3][4]. Since then, the raccoon dog has also been detected in Belgium [5], Croatia [6], France [7][8], Macedonia [9], the Netherlands [10], Switzerland [11] and Turkey [12].

There were indications regarding the presence of the raccoon dog in Luxembourg as early as 1997, but without confirmation [13]. On several occasions in the past, we launched appeals asking hunters to inform the *Administration de la nature et des forêts* (ANF) about any road-killed or hunted raccoon dogs [14][15]. However, none of the photos and carcasses that we could verify proved to be of raccoon dogs, but rather of raccoons *Procyon lotor* (Linnaeus, 1758) or European badgers *Meles meles* (Linnaeus, 1758) (Schley & Jacobs, unpublished data), leaving Luxembourg without any confirmed raccoon dog records [16]. In the framework of Luxembourg's Natura-2000 monitoring of pine marten *Martes martes* (Linnaeus, 1758), Western polecat *Mustela putorius* Linnaeus, 1758 and wildcat *Felis silvestris* Schreber, 1777, 169 1×1 km squares were surveyed between 2011 and 2020, using camera traps. Of the 77749 photographs generated, 10 889 were of European badgers,

9514 of red foxes *Vulpes vulpes* (Linnaeus, 1758) and 5269 of raccoons, three other species with an opportunistic feeding behaviour, whereas not even one photograph showed a raccoon dog (Mestdagh, unpublished data), further pointing towards the absence of the latter in Luxembourg.

On 3 February 2021 at around 18.00, a hunter (D. Hipp) discovered an animal thought to be a raccoon dog hiding in a patch of high grass in an unmown meadow near the village of Livange in southern Luxembourg. She took photographs of the animal and sent those to the ANF for verification on 5 February 2021. We were able to confirm the species in the pictures (Fig. 1). The same day, we visited the meadow of the sighting with D. Hipp and were able to identify the exact spot where the photos had been taken (WGS84: 6.10777° E, 49.53823° N) (Fig. 2). Therefore, to our best knowledge, this is the first confirmed record of the raccoon dog in Luxembourg.

In Luxembourg, the raccoon dog is listed in the appendix of the national hunting law and thus has the status of game species [17]; it can be hunted year-round (except for a six-week hunting-free period from 1 March to 15 April). Within the framework of the regulation on the prevention and management of the introduction and spread of invasive alien species of the European Union [18], the raccoon dog was included in the list of invasive alien species of Union concern in 2017 [19]. The reasons for inclusion were the possible negative impacts on native biodiversity (namely on ground-nesting birds and amphibians), the potential risk on human health, and its role in spreading diseases and parasites to other species, as the raccoon dog can be an important vector of rabies (RABV), sarcoptic mange, trichinellosis and *Echinococcus multilocularis* [2][10][20][21].

The detection of the raccoon dog in Luxembourg raises conservation concerns, similar to those relating to the establishment and rapid spread of the raccoon [13][22]. Due to its cryptic behaviour, the raccoon dog is difficult to detect, especially during the early stages of colonisation [20]. A monitoring scheme should be put in place to determine whether the raccoon dog near Livange is likely a solitary individual or whether the species is established in the area. In the latter case, a management plan should be developed with all stakeholders to define further action, particularly given the high reproductive potential of the raccoon dog [21]. Considering the raccoon dog's expansion over the past decades, it seems likely that the species will eventually colonise large parts of Western Europe, including Luxembourg. Stopping this trend seems to be an impossible task, even with intensive hunting and significant means to monitor the spread, especially since there is evidence that the raccoon dog can compensate for high mortality with increased reproduction [23][24]. In view of this lost cause, the return of the wolf *Canis lupus* Linnaeus, 1758 to Luxembourg [25], if permanent, may contribute to the regulation of this invasive alien species. Indeed, this apex predator can be responsible for a high percentage (55–64%) of raccoon dog mortality in the latter's native range [26], maybe less so in Europe (7%) [27]. More rigorous protection measures, including various species-specific habitat improvements, should be implemented to protect vulnerable, known prey species to mitigate the raccoon dog's potential negative effects on native biodiversity.

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Fig. 1 – The first confirmed record of the raccoon dog *Nyctereutes procyonoides* in Luxembourg; © Danielle Hipp.



Fig. 2 – Location of the first confirmed record of the raccoon dog *Nyctereutes procyonoides* in Luxembourg.

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