

Raccoon (*Procyon lotor*): the invasive alien species and a threat to the life and health of EU citizens

Role: animal welfare NGO

Audience: EU Institutions (COMM, Council, PE, EESC, Committee of Regions)

Summary

KEY POINTS

1. The spread of the raccoon within the EU is suspected of threatening ecosystems 'biodiversity and exposing people to diseases

2. The actual extent of such threats caused by raccoons on European populations seems overestimated

3. Non-lethal population control measures and information campaigns about health risks are recommended in parallel to targeting research funding

Invasive alien species are considered one of the main threats to biodiversity. As an invasive alien species, raccoon (*Procyon lotor*) has been legally recognised in the European Union since 2016. Because of human introduction in the 20th century, raccoons spread all over Europe. In light of Regulation (EU) 1143/2014, their continental population is to return under human control by application of lethal and non-lethal means. However, the identified potential threats to biodiversity, and human health, attributed to raccoons are not supported by existing scientific proof. Rudimentary studies of the European population suggest that the risk assessed by the European Commission seems overestimated. To acquire more knowledge, targeting research funding is highly recommended. Until a re-evaluation of threats posed by *procyon lotor*, the EU is encouraged to promote only non-lethal population control measures and coordinate an information campaign about relevant disease risks.



Figure 1. Raccoon [1] - *Procyon lotor* [13], also called *ursus lotor* [17], Northern raccoon [7] and North American raccoon [5]

1. Invasive species: a threat

In today's global world, people transport plants, animals, fungi or micro-organisms outside their natural ranges, i.e. far beyond the areas where they used to live or appear hitherto [2, 3]. In that context, intentionally relocated species have been used for agriculture, forestry, fishing, decorative, and recreational purposes, generating monetary and social benefits. From the perspective of the receiving native ecosystems and habitats, such new inhabitants are called alien species [2]. Usually, their occurrence does not cause concern. However, there are exceptions to this rule. In Europe, from the set of 12000, scientists classified 10% - 15% (1200 - 1800) as invasive alien species [4] (neozoa) [5], threatening or adversely impacting the environment, economy, society or living organisms' health [2]. Researchers *consider* those invasive alien species as one of the main threats to biodiversity loss [4, 6, 7]. By competing with native fauna and flora for resources, the neozoa may displace or even cause the extinction of unique variants or races. To effectively address the causes of the effects of their introduction, unilateral national action by individual states had proven insufficient. As the invasive alien species spread within natural boundaries, not artificial political ones, suitable legally-backed approaches to invasive alien species were developed on regional, supranational and international levels [2].

2. Legal countermeasures

The United Nations Convention on Biological Diversity ('CBD') constitutes the only globally applicable, legally binding instrument comprehensively addressing risks associated with invasive alien species spread across all biological taxa and ecosystems [2, 6].

On the one hand, the CBD obliges to undertake general measures for the conservation of biodiversity, like strategies, action plans and interstate cooperation. On the other hand, that legal act contains also a provision explicitly concerning invasive alien species. Art. 8 (h), requires each CBD's party, as far as possible and appropriate, to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or [other] species [8]. So far, the CBD has been ratified by 196 nations [9], including all EU Member States [10], and signed and approved by the European Union ('EU') [11].

Against that background, the EU itself put in place Regulation (EU) 1143/2014 on the prevention and management of the introduction of invasive alien species ('the Regulation'). The Regulation sets out rules on responses to the adverse impact on biodiversity posed by invasive alien species [4]. Compared to Art. 8 (h) CBD, the EU legislator provides comparably more direction to the EU Member States on how to proceed with implementation [2, 4, 6]. It includes dedicated articles on the prevention of introduction, early detection, rapid eradication, population control and management of invasive alien species. By applying those measures, the EU legal framework explicitly permits lethal and non-lethal means or actions against invasive alien species [4, 12]. However, to become subject to actions applicable across the EU, a particular invasive alien species must be considered 'of Union concern'. When that is the case, the species name will be included in an adopted implementing legal act containing a list of invasive alien species of Union concern ('the Union list') [4].

3. Raccoon: the EU's invasive alien species

Since its adoption in 2016, *Procyon lotor* (Linnaeus, 1758) figures on the abovementioned Union list [13, 14, 15, 16]. The species also appears under other names, like the Latin *ursus lotor*, and in English as North American [5] or Northern raccoon [7] ('raccoon'). Originally from North America, the raccoon is the most common member of the half-bear predator group in Europe [5]. The first documented cases of intentional release in Europe to the wild occurred in Germany in 1934 [5, 7]. Ever since, their number has spread through purposeful liberations for wild hunting and accidental escapes from breeders, fur farms and private pet holders. The species has a high reproductive rate, is very mobile - easily crosses the landscape barriers, and encounters few natural predators in Europe. Thus, the number of continental *procyon lotor* and inhabited areas has increased constantly.

So far, raccoons' presence has been spotted in 18 of 27 EU Member States [5], among which established populations have been reported in 13 countries [19].

3.1. Raccoon: suspected of biodiversity loss

To be included on the Union list, a species must meet all specific criteria indexed in Art. 4 (3) of Regulation (EU) 1143/2014. In a nutshell, to be considered as 'of Union concern', a species alien to the territory of the EU shall be capable of establishing a viable population and spreading in the environment while having a significant adverse impact on biodiversity and human health or the economy (Art. 4 (3) (a)-(c)). Furthermore, a risk assessment shall be performed (Art. 5 (1)). Its outcome must demonstrate that concerted action at the EU level is required (Art. 4 (3) (d)). Finally, it shall be likely, that the inclusion on the Union list will effectively prevent, minimise or mitigate an adverse impact of an alien species (Art. 4 (3) (e)). Such evaluation, including the impact assessment, is performed by the European Commission, which should consider the available scientific evidence [4].



Figure 1. European distribution of raccoons (blue: raccoons detected, green: no raccoons detected, gray: non-European country, not considered). A state is defined as a distribution area of raccoons, regardless of the abundance and distribution of the raccoons within the state territory. The year indicates the first detection of raccoons in a national territory.

Source (edited): [5]

Nevertheless, questions can be raised about the relevance and European dimension of the study underlying the risk assessment. The Risk Assessment report quoted by the European Commission was issued in 2011 exclusively for the territory of the United Kingdom [18]. As that country no longer belongs to the EU, the Risk Assessment report cannot support the criterion of required action on the EU level. In addition, the scientific evidence undergirding that study refers extensively to non-European populations of raccoons. The threats to species, habitats and ecosystems caused by raccoons in Japan and the United States were uncritically attributed to their European population without any further substantiation or concrete evidence. For example, the proven small impact of raccoons on rodent populations, used to underpin the reasoning in favour of their relevant environmental harm [18], refers to a North American study area [20]. At the same time, the Risk Assessment file refers later to academic research making opposite claims. That research proves that there is a lack of evidence for a negative impact on native prey or competitors in Germany [18], where the first release of raccoons took place and which remains their distribution hotspot [5]. There is also 'no evidence of raccoon impact on insects, fish, amphibians or reptiles in Europe' [18]. More importantly, the accompanying document to the Risk Assessment confirms that no European species at the global International Union for Conservation of Nature's Red List of Threatened Species level experience threat or pressure from raccoons [19]. It is equally hard to find convincing evidence that seabirds or waterfowl would suffer from raccoon presence in Natura 2000 habitats, such as wetlands, when the Risk Assessment file recalls that there are no relevant studies on that topic [19].

In particular, the threat seems overestimated, as the density of the *procyon lotor* population in wetlands is much lower (2 individuals/100 hectares) than in urban and rural areas (100 individuals/100 hectares) [18]. In the areas lacking in human aliment supply and close to nature, raccoons spread slowly: as the distribution of food sources influences the density of raccoons [5, 7].

Recent studies even further undermine the conclusions of the 2011 risk assessment. M. Stope (2023) indeed claims that the raccoon's negative impact on native fauna and flora in Europe seems only marginal. A significant negative impact on the native fauna has been suspected but not proven. That study explicitly mentions that the current adverse impact of raccoons 'is considered to be rather low', as no relevant observations of negative influence have been made so far. While the conflicts with native fauna and humans are present, their significance in Europe remains 'nowhere near as significant as in the raccoon's original distribution range in North America' [5]. In effect, the alleged threat of raccoons to European biodiversity remains a speculation. Compliance of *procyon lotor* with the criterium of the likelihood of 'significant adverse impact on biodiversity' under Art. 4 (3) (e) of Regulation (EU) 1143/2014 thus seems thus questionable [4].

3.2. Raccoon: suspected of endangering human health

The relocation of alien species to new ranges presents opportunities for transmitting certain strands of microorganisms that may affect the health of humans and animals [2]. At the EU level, such a trend has been acknowledged by the legislator, which inserted into Regulation (EU) 1143/2014 the Union list inclusion

Procyon lotor may carry pathogens of i.a. rabies, canine distemper, encephalitis, histoplasmosis, trypanosomiasis, coccidiosis, toxoplasmosis, tularemia, tuberculosis, listeriosis, leptospirosis, roundworms and mange [18]. However, the most adverse consequences threaten those infected with the most common parasite - raccoon roundworm (*baylisascaris procyonis*) [18]. The infection initiates the ingestion of parasite eggs excreted with raccoon faeces. When ingested by humans, these eggs can cause severe or fatal infectious illness [5]. *Baylisascaris procyonis* may equally concern wild and domestic animals like dogs, rodents, foxes and weasels. That roundworm has been identified in bodies of over 90 species causing a fatal central nervous system disease in commercial chickens, pheasants and rabbits [18]

As in the case of biodiversity, the United States remain the central source of scientific data on threats to human health attributed to raccoons [18]. In North America, over 80% of raccoons host *baylisascaris procyonis* and thus pose a corresponding risk of infection for people. A completely different situation emerges from the sparse data available for Europe, where only a few cases of infectious disease transmissions by raccoons have been documented over the decades [5]. Therefore, even in Europe, the infection danger cannot be completely ruled out. The eggs of raccoon roundworms are highly resistant to environmental influences and remain infectious for a long time. In urban and farmland areas with high raccoon density, endangered are children and pets. To minimise such a health threat, informing vulnerable groups becomes a priority. Additionally, pathogens of European alien species like raccoons shall undergo comprehensive research [3]. However, its performance would require targeted EU funding.

4. Raccoon: sentenced to eradication

In their totality, the power of arguments justifying the inclusion of raccoons on the Union list seems rather low. Neither the likelihood of a significant adverse impact on biodiversity nor an adverse impact on human health find support in scientific evidence concerning Europe. It can even be said that the North American and Japanese populations of raccoons shaped the EU legal framework. Despite those circumstances, as the *procyon lotor* remains included on the Union list, all the EU Member States have been authorised to select suitable lethal and non-lethal measures to eradicate, control or manage the species [12].

When taking the German situation as a starting point, the exact number of German *procyon lotor* population is unknown. The pre-2011 estimations vary between 100,000 and one million [18]. More precise are official German hunting statistics that indicate a rapid increase in their number. While 3000 raccoons were shot in 1995 (100 per hunting license), 100 000 animals killed were recorded two decades later (3400 killed animals/hunting license in 2015/2016) [5]. Another humane lethal method for diminishing the number of raccoons is a kill trap, where raccoons undergo euthanasia by CO₂ inhalation [7]. Considering insufficient and limited evidence, such lethal eradication strategies seem exaggerated. Moreover, all attempts and management strategies for controlling the European population size and dispersal potential of raccoons have failed so far because of the high reproductive rate and the high mobility of the animals [5]. Even a 3-year-long ‘successful’ campaign using kill traps could not annihilate all recently introduced raccoons in Northern Italy [7]. To eradicate already established populations is considered difficult or even impossible [18].

The EU Member States shall thus consider alternative strategies for raccoons. One of them may be to accept raccoons as part of the European fauna [18]. Another solution may be the control of the national raccoon populations by non-lethal methods, as recommended in the context of animal welfare by recital (25) of Regulation (EU) 1143/2014 [4]. The European Union could support the EU Member States by preparing guidelines for applying non-lethal methods against raccoons. Such soft-law documents could provide details on traps, their efficient localisation and sterilisation technics.

5. Recommendations

1) Launching targeted EU research funding on European populations of raccoons

The European Union could consider directing funds to acquire adequate knowledge of raccoon populations. The dedicated research project call under Horizon Europe may engage external experts to assess *procyon lotor*'s potential threats to the EU's biodiversity, human health and economy. Such funding opportunities would enable the performance of an accurate risk assessment of the species and an efficient application of harmonised countermeasures in affected EU Member States.

2) Promotion of the choice of non-lethal population control in the EU

While eradication measures proved ineffective, the EU Member States shall consider a shift towards non-lethal methods of limiting the raccoon population. An EU-wide guidance document on cage traps and sterilisation prepared by the European Commission could encourage the EU Member States to spare the lives of animals. Such non-lethal traps may be primarily installed in easily accessible places in urban and rural areas surrounding Natura 2000 sites.

3) Information campaigns about disease risks caused by raccoons require coordination on the EU level

Finally, in addition to continuing EU-level monitoring of potential risks of infection from wild raccoons proposed [5], it is worth providing EU citizens with reliable information on threatening diseases. As a priority, the information campaign should target the most crucial groups like parents of little children, teenagers, pet owners, vets and family doctors. Launching an EU-wide campaign on *baylisascaris procyonis* may improve the overall detection rate of the parasitic disease.

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Author : Katarzyna Aleksandra JANCEWICZ, PhD Researcher, Université de Liège, Member of ERC EUDAIMONIA project team. This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement n° 948473).

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