

# NOBANIS - Invasive Alien Species Fact Sheet

## *Nyctereutes procyonoides*

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### Author of this species fact sheet

Rafał Kowalczyk, PhD, Mammal Research Institute, Polish Academy of Sciences, 17-230 Białowieża, Poland, tel. (+48) 85 6827784, fax. (+48) 85 6827752. E-mail: [rkowal@bison.zbs.bialowieza.pl](mailto:rkowal@bison.zbs.bialowieza.pl);

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### Species description

**Scientific names:** *Nyctereutes procyonoides*, (Gray, 1834) *Canidae*.

**Synonyms:** *Canis procyonoides*

**Common names:** Raccoon dog (GB), Marderhund (DE), Mårhund (DK), Kährikkoer (EE), Supikoira (FI), Chien viverrin (FR), Usûrinis ūuo (LT), Jenotsuns (LV), Mårdhund (NO), Jenot (PL), Enotovidnaya sobaka (RU), Собака енотовидная (RU), Mårdhund (SE).



**Fig. 1.** *Nyctereutes procyonoides*, photo by R. Kowalczyk.



**Fig. 2.** *Nyctereutes procyonoides*, photo by R. Kowalczyk.

### **Species identification**

*Nyctereutes procyonoides* is the size of a fox, but with shorter legs and tail. A relatively elongated body, small head with a short and sharply pointed muzzle and short rounded ears are typical. A black facial mask, and long hair on cheeks. Body colouration varies from yellow to grey or reddish. The chest, throat, legs and feet are blackish-brown, black hairs on the back, shoulders and dorsally on the tail. In winter the fur is thick with long guard hairs. In summer the animal looks much slimmer (Ward and Wurster-Hill 1990, Kauhala and Saeki 2004a).

### **Native range**

The natural range of raccoon dogs covers large parts of China, north-east Indochina, Korea, eastern Siberia (Amur and Ussuri regions), Mongolia and Japan (Ward and Wurster-Hill 1990, Kauhala and Saeki 2004a).

### **Alien distribution**

#### **History of introduction and geographical spread**

From 1929 to the late 1950s *N. procyonoides* were introduced as fur game species to the European part of the former Soviet Union, Siberia, Middle Asia (Kazakhstan, Kyrgyzstan) and Caucasus of the former Soviet Union (Lavrov, 1946). First introduced animals originated from the Amur and Ussuri region of the former Soviet Union (Morozov, 1953, Rall and Kritskaya, 1953). Later, raccoon dogs were captured and translocated from successfully settled populations to new areas. *N. procyonoides* have adapted very well to habitats in Eastern Europe and quickly spread to the north and west. Raccoon dogs first invaded Finland in 1935, reached Sweden in 1945-46, then Romania in 1952, Poland in 1955, Slovakia in 1959, Germany and Hungary in 1961-62, Norway in 1983 (Nowak and Pielowski 1964, Kauhala 1996a). It was brought to Estonia in 1950 and it spread very fast. *N. procyonoides* invaded Estonia also from Leningrad and Pihkva regions and from Latvia (Kull *et al.* 2001).

### Pathways of introduction

Large scale deliberate introduction (Nowak and Pielowski 1964). In some areas (*e.g.* in Hungary), some populations were probably created from animals escaping from fur farms or captivity (Heltai *et al.* 2000).

### Alien status in region

In some areas (*e.g.* in Finland, Baltic countries), *N. procyonoides* is among the most common carnivore. It is widespread and common in Finland, Poland, Belarus, Latvia, Lithuania, Estonia, Ukraine, western Russia and Germany and rare in Sweden (see also table 1). It occurs also in Czech Republic, Slovakia, Hungary, Bulgaria, Serbia, Moldova, and Romania. It is sporadically seen in Austria, Bosnia, France, Netherlands, Denmark, Norway (first breeding observed in 2005, R. Andersen, pers. com.), Slovenia and Switzerland (Mitchell-Jones *et al.* 1999, Kauhala and Saeki 2004a). Some raccoon dogs have also been seen in the eastern Alps in Italy (P. Genovesi, in press).

Country	Not found	Not established	Rare	Local	Common	Very common	Not known
Denmark		X					
Estonia						X	
European part of Russia					X		
Finland						X	
Faroe Islands	X						
Germany					X		
Greenland	X						
Iceland	X						
Latvia					X		
Lithuania					X		
Norway		X					
Poland					X		
Sweden			X				

**Table 1.** The frequency and establishment of *Nyctereutes procyonoides*, please refer also to the information provided for this species at [www.nobanis.org/search.asp](http://www.nobanis.org/search.asp). Legend for this table: **Not found** –The species is not found in the country; **Not established** - The species has not formed self-reproducing populations (but is found as a casual or incidental species); **Rare** - Few sites where it is found in the country; **Local** - Locally abundant, many individuals in some areas of the country; **Common** - Many sites in the country; **Very common** - Many sites and many individuals; **Not known** – No information was available.

## Ecology

### Habitat description

Raccoon dogs prefer moist deciduous and mixed forests with abundant understore, river valleys, lakeshores, marshes, and moist heath (Kauhala 1996b, Jędrzejewska and Jędrzejewski 1998). They may occupy also a mosaic of woodland and agricultural area (Drygala *et al.* 2000).

## Reproduction and life cycle

Raccoon dogs achieve sexual maturity at 9-11 months. Females can deliver young annually. Mating occurs from February to April, usually in March (Helle and Kauhala 1995). The gestation period is nine weeks, and cubs are born from April to June. In Japan litter size is smaller (4-5 young/litter) than in the Russian Far East and in the introduced area in Europe (mean 7-9 young/litter, max 16) (Judin 1977, Helle and Kauhala 1995, Kauhala 1996c, Kowalczyk *et al.* 2000, Kauhala and Saeki 2004b). Proportion of breeding females in the population averages 80% (Helle and Kauhala 1995). Climatic conditions (especially the length of the summer) and food availability may influence reproductive output (Kauhala and Helle 1995).

## Dispersal and spread

In the period from 1935 to 1984 *N. procyonoides* has colonised 1.4 million km<sup>2</sup> of Europe by secondary expansion (Nowak 1984). This is the result of their great plasticity in adaptation to various climatic and environmental conditions, the ability to hibernate in winter, high reproductive capacity, migratory ability, omnivorousness, and limited control. Most juveniles disperse at 4-5 months of age (August-October). Average dispersal distance does not exceed 20 km, but dispersion on distance over 150 km has been reported (Kauhala and Helle 1994).

## Impact

### Affected habitats and indigenous organisms

*N. procyonoides* are opportunistic omnivores. Their food niche is much wider than those of most other carnivores. Diet composition of *N. procyonoides* varies geographically and is mainly influenced by availability of food resources. Ungulate and other carcasses and amphibians play a main role in raccoon dog diet in forest areas, plant material, small mammals and invertebrates in woodland and farmland mosaic, waterfowl, amphibians and plant material on marshlands, lake shores and small islands (Kauhala *et al.* 1993, 1998, Jędrzejewska and Jędrzejewski 1998, Drygala *et al.* 2000, Sidorovich *et al.* 2000, Kauhala and Auniola 2001, Baltrūnaitė 2002).

Raccoon dogs have been reported to cause severe damage to waterfowl colonies in Estonia (refs in Kauhala (1996a), Kull *et al.* 2001). It may also be a serious predator of tetraonid birds (V. Sidorovich, pers. comm.). *N. procyonoides* may become a threat to bird and frog populations, particularly on islands (Kauhala 1996a). As reported by Kauhala and Auniola (2001), in summer 2-67% of raccoon dog faeces contained waterfowl (mainly eider) remains, but most probably a major part of them was found as carcasses and raccoon dogs were estimated to kill only 1.2-3.5% of brooding female eiders in the Finnish archipelago each year. Rather many scats (11-40%) contained egg shells. More egg shells were found in the scats in July (after eider chicks had hatched) than earlier in summer. The predatory impact may differ from area to area, depending on food availability and the local fauna composition (Kauhala and Auniola 2001).

*N. procyonoides* are omnivorous carnivores and may potentially compete with native species such as red fox (*Vulpes vulpes*) and badger (*Meles meles*). In some areas, raccoon dogs (which are very efficient scavengers; Selva 2004), may affect densities of other generalist carnivores; by decreasing the availability of carrion, important feeding resource; especially in late winter/early spring (Sidorovich *et al.* 2000).

*N. procyonoides* often settle in badger setts in winter and during the reproduction season (Kowalczyk *et al.* 2000, R. Kowalczyk, unpubl. data). This may lead to disease and parasite transmission. Raccoon dogs are important carriers of rabies, sarcoptic mange, *Echinococcus multilocularis* and trichinellosis (Oivanen *et al.* 2002, Westerling 1991). In Finland an association between the density of *N. procyonoides* and the incidence of infection with *Trichinella* sp. larvae of the European lynx (*Lynx lynx*) has been demonstrated (Oksanen *et al.* 1998). *N. procyonoides* are

also often killed by other carnivores (*e.g.* wolves and dogs, R. Kowalczyk, unpubl. data), which creates a risk of disease transmission to these carnivores.

### **Genetic effects**

No reported genetic effects. The raccoon dog is the only member in its genus. Thus, it is very unlikely that it hybridizes with other species.

### **Human health effects**

*N. procyonoides* is one of the main vectors of rabies in Europe. In the 1990s in Poland, Lithuania, Latvia and Estonia, from 7 to 16% of all rabies cases were found in raccoon dogs. In Estonia, > 50% of wildlife rabies cases were found in raccoon dogs in 2004. In 1999-2004 in Poland over 700 raccoon dogs (*i.e.* 8 % of all cases) with rabies were recorded. During rabies epizootic in Finland in late 1980s, 77% of the cases identified were in raccoon dogs (Westerling 1991).

Raccoon dogs are potential vectors of *Echinococcus multilocularis*, a parasite dangerous for humans.

### **Economic and societal effects (positive/negative)**

Apart from being a vector of diseases and parasites, such as rabies and *Echinococcus multilocularis*, no economic impact has been reported. In Finland, some hunters still hunt raccoon dogs because of their fur. The price of the fur has been increasing in recent years.

## **Management approaches**

### **Prevention methods**

*N. procyonoides* is listed in Recommendation no. 77 of Convention on the Conservation of European Wildlife and Natural Habitats among the invasive species, which have proved to be a threat to the biological diversity and should be eradicated. Because of their secretive behaviour, practically it is impossible to prevent the expansion of raccoon dogs in Europe. In some countries (*e.g.* in Sweden), the law states that alien species, such as raccoon dogs should not be permitted to establish in the country and may be hunted throughout the year (Act on hunting, SFS 1987: 905). It also regulates the entry and spread of animals in order to prevent the introduction of alien animal species that may harm the indigenous fauna (The Act on import of living animals, SFS 1994:1830).

### **Eradication, control and monitoring efforts**

Raccoon dogs are seldom hunted for their fur, but rather due to their status as pests in Europe. In Norway, Estonia, Latvia and Lithuania raccoon dogs may be hunted all year round, with no protection during breeding season. In Denmark hunting is not allowed unless harm is done to game animals (Taastrøm 1999). In Finland and Poland raccoon dogs are protected during breeding season (in Finland, only females with puppies are protected in May-July). In Finland, the annual hunting bag varied between 75,000-130,000 in 1998-2003 (Kauhala and Saeki 2004a, Kauhala, pers. comm.), c.a. 20,000 in Germany (S. Schwarz, pers. comm), 6,000-10,000 in Poland (data of Research Station of Polish Hunting Society in Czempin), 4,000-5,000 in Estonia, 3,500-4,000 in Lithuania (L. Baltrūnaitė, pers. comm), and 2,000 in Latvia. In other countries raccoon dogs are hunted occasionally.

In Norway farming of non-native animals demands an exemption from regulations in the Wildlife Act, and no such permits are yet given for raccoon dogs (Erik Lund, pers. comm.). Finland prohibits catching raccoon dogs from the wild for transportation to the fur farms due to the risk of rabies

(Kaarina Kauhala, pers. comm.). Locally, intensive trapping with box and wire traps and hunting with dogs may be methods of raccoon dog eradication. Eradication is, however, difficult, because raccoon dogs, like other canids, tend to increase their litter size when hunting pressure on them is high.

### **Information and awareness**

Information on the distribution and spread of *N. procyonides*, and on its impact on native fauna is urgently needed.

Public information on raccoon dog is very scarce. Some countries have prepared reports on alien species. Some information is available on Internet (see Links). In Estonia the Ministry of Environment has published two booklets introducing invasive alien species of local importance (in 2001 and 2005). An electronic database on invasive alien species has also been created, available at [www.envir.ee](http://www.envir.ee). The purpose of those booklets is to make the wider range of people aware of the problems going hand-in-hand with the spread of invasive species.

### **Knowledge and research**

The species is the subject of ecological research projects in Japan, Finland, Poland and Germany. These studies have focused on home-range size, habitat use, social organization, activity, diet, the impact of raccoon dogs on native fauna and (in Finland) their role as a vector of diseases (rabies) and parasites. However, still little is known on distribution, densities, interactions with other animals, and the impact of raccoon dogs on native fauna.

### **Recommendations or comments from experts and local communities**

The raccoon dog will continue its expansion in Europe and will increase in numbers in some areas where populations have been established. Raccoon dogs may benefit from the warming of climate (long winters limit their distribution). A nationwide monitoring program for raccoon dogs is recommended. It should focus on distribution and role of raccoon dog in ecosystems, as a vector of diseases and parasites, and its impact on native fauna (diet analysis, predation/competition impact estimates), especially in nesting areas of waterfowl and other bird species.

The raccoon dog should be controlled in every country where it is non-native. Immediately after verified cases of its occurrence in certain country it should be included on list of game species and persecuted. It is necessary to draw hunter and manager attention to the problem. Bait vaccinations against rabies should be done in areas where there is a risk that raccoon dogs will bring the disease to the area. In these areas hunting is not the solution to the problem, because high hunting pressure may accelerate the movements of individuals and create an unstable, increasing raccoon dog population where disease transmission is likely. However, as stated above, raccoon dog is an omnivore (not a skilful hunter) and there is very little scientific evidence that it is really harmful *e.g.* to waterfowl. It may cause damage locally, but generally its impact on bird populations has probably been exaggerated.

## **References and other resources**

### **Contact persons**

Christina Birnbaum (EE) Estonian University of Life Sciences, Institute of Agricultural and Environmental Sciences, Kreutzwaldi 64, EE-51014 Tartu, Estonia, E-mail: [chbirnbaum@yahoo.com](mailto:chbirnbaum@yahoo.com)

Kaarina Kauhala (FI) Finnish Game and Fisheries Research Institute, Turku Game and Fisheries Research, Itäinen Pitkätatu 3 A, FIN-20520 Turku, Finland, E-mail: [kaarina.kauhala@rktl.fi](mailto:kaarina.kauhala@rktl.fi)

Rafał Kowalczyk (PL) Mammal Research Institute, Polish Academy of Sciences, PL-17-230 Białowieża, Poland, E-mail: [rkowal@bison.zbs.bialowieza.pl](mailto:rkowal@bison.zbs.bialowieza.pl)

Janis Ozolins (LV) State Forest Service, Department of Hunting, Riga, 13 janvara Str. – 15, LV-1932, Latvia, E-mail: [janis.ozolins@vmd.gov.lv](mailto:janis.ozolins@vmd.gov.lv)

Melanie Josefsson (SE) Swedish Environmental Protection Agency, c/o Dept. of Environmental Analysis, SLU, P.O.Box 7050, SE-750 07 Uppsala, Sweden. Tel: +46 18 673148, Fax: +46 18 673156. E-mail: [Melanie.Josefsson@snv.slu.se](mailto:Melanie.Josefsson@snv.slu.se)

Maslyakov Valery (RU) Institute of Geography, Russian Academy of Sciences, Moskow, Staromonetnyi pereylok, 29, Russia. Tel.: 495 9590016. E-mail: [Maslyakoff@mail.ru](mailto:Maslyakoff@mail.ru)

## Links

Alien species in Poland – [fact-sheet](#)

Lion crusher's domain – [fact-sheet](#)

Animal Diversity Web – [Michigan University, Zoological museum](#)

IUCN Red List of Threatened Species [on \*Nyctereutes procyonoides\*](#)

IUCN – Canid Specialist group – [bibliography on \*Nyctereutes procyonoides\*](#)

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