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Cases of occasional interspecific brood parasitism and egg dumping in Hungary

László Haraszthy

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Abstract There are numerous publications in the ornithological literature on mixed-species broods, i.e. on cases when a species lays some or all of its eggs into the nests of other species. This phenomenon, known as brood parasitism, has not yet been studied in Hungary. Here, I use the term brood parasitism, but I could not separate cases of egg dumping, a reproductive error by females. Based on literature and my own observations, I found evidence for interspecific brood parasitism in 28 species breeding in Hungary, not including the cases of the obligate interspecific brood parasite, the Common Cuckoo *(Cuculus canorus)*. Only one of these belongs to passerines, while in the rest of the cases, this phenomenon occurred in representatives of non-passerine families. However, cases of brood parasitism and nest parasitism have to be treated separately. The latter refers to cases when a species occupies a nest, usually a nesthole or nestbox, already containing eggs of another species, and lays its own eggs next to the foreign eggs. The present study provides data on European Roller *(Coracias garrulus)*, Northern Goshawk *(Accipiter gentilis)*, Common Kestrel *(Falco tinnunculus)*, Red-footed Falcon *(Falco vespertinus)*, Eurasian Hobby *(Falco subbuteo)*, tit species (*Parus, Cyanistes, Poecile* spp.), Eurasian Nuthatch *(Sitta europaea)* and Eurasian Tree Sparrow *(Passer montanus)*, but in all likelihood the number of species involved is much higher.

Keywords: brood parasitism, nest parasitism, egg dumping, abandoned addled egg, non-passerines, passerines

Összefoglalás A madártani szakirodalomban számos tanulmány foglalkozik a fajok közötti összetojás kérdésével, azaz az olyan esetekkel, amikor egy faj tojásainak egy részét vagy mindet másik faj fészkébe rakja. Ezt a költésparazitizmusnak nevezett jelenséget eddig Magyarországon nem vizsgálták. Irodalmi adatok és saját megfigyeléseim során 28 Magyarországon fészkelő faj esetében találtam bizonyítékot költésparazitizmusra vonatkozóan. Ezek közül mindössze egy eset kapcsolódik énekesmadarakhoz, míg a többi esetben más rendekbe tartozó családok képviselőinél fordult elő ez a jelenség. El kell azonban különíteni a költésparazitizmus és a fészekparazitizmus esetét, amikor már tojásos fészket – elsősorban odút vagy költőládát – foglal el egy másik faj, és abba rakja saját tojásait az idegenek mellé. A tanulmányban szalakót**ára**, vörös és kék vércs**ére**, cinegefélékre, csuszkára vonatkozóan közlök adatokat, de minden bizonnyal ezeknek a fajoknak a köre ennél sokkal szélesebb.

Kulcsszavak: költésparazitizmus, fészekparazitizmus, visszamaradt záp tojás, verébalakúak

BirdLife Hungary, 1121 Budapest, Költő utca 21., Hungary, e-mail: haraszthyl@gmail.com

Introduction

A number of bird species are known to lay their eggs into the nests of other species so their offspring are raised by foster parents. These species are regarded as classic brood parasites. However, there are also species that lay their eggs into foreign nests only under certain conditions that are rather rare – this is known as facultative brood parasitism. This phenomenon can be either intraspecific or interspecific. It has been revealed in an increasing number of species that they lay some or all of their eggs in the nests of their conspecifics (Yom-Tov 2001, Haraszthy 2019a), and this phenomenon is called intraspecific brood parasitism or conspecific brood

parasitism. It has long been known that gallinaceous birds (Galliformes) and ducks (Anseriformes) include species that may lay eggs not only into the nests of conspecifics, but also of other species. Krakauer and Kimball (2009) published data on intraspecific brood parasitism in 11 gallinaceous species, ca. 4% out of 281 species, that laid their eggs into the nests of 29 different bird species. Intraspecific brood parasitism was by far the most frequent in Common Pheasant *(Phasianus colchicus)* whose eggs were found in the nests of 19 other species. These included 6 duck species (Anatidae), 8 gallinaceous species (Phasianidae), 4 rail species (Gallidae) and one species in the snipe family (Scolopacidae) the nestlings of all of which are nidifugous.

Interspecific brood parasitism is significantly more common among nidifugous species than among species whose nestlings are nidicolous (Lyon & Eadie 1991). At the same time, there are cases when a nidifugous species, such as the Common Moorhen *(Gallinula chloropus)* lays its eggs into the nests of a nidicolous species, e.g. Little Bittern *(Ixobrychus minutus)* (Haraszthy 2018) or Yellow Bittern *(Ixobrychus sinensis)* (Ueda 1993, Ueda & Narui 2004).

In breeding colonies, the chance is always higher that the species, nesting there, lay their eggs into the nests of another species. In the USA, Cannell and Harrington (1984) found Black-crowned Night Heron *(Nycticorax nycticorax)* eggs on two occasions in Snowy Egret *(Egretta thula)* nests, and Great Egret *(Ardea alba)* eggs in a Black-crowned Night Heron nest.

In Madagascar, Werding (1970) found Cattle Egret *(Bubulcus ibis)* eggs in Black-crowned Night Heron nests on two occasions. Gonzales-Martin and Ruiz (1996) found Cattle Egret or Little Egret *(Egretta garzetta)* eggs in four Squacco Heron *(Ardeola ralloides)* nests in the Ebro Delta, Spain. (The eggs of the two species cannot usually be safely separated on sight, because both are unifom light blue and largely overlap in size (Haraszthy 2019b)). The same authors also found a certain Little Egret egg in a Squacco Heron nest. Niemczynowicz *et al.* (2015) proved interspecific nest parasitism in five colonially breeding bird species in the Biebrza Valley, Poland. In Northern Lapwing *(Vanellus vanellus)* nests, they found Common Redshank *(Tringa totanus)*, Black-tailed Godwit *(Limosa limosa)*, Black-headed Gull *(Larus ridibundus)* and Common Tern *(Sterna hirundo)* egg or eggs. They observed Northern Lapwing eggs in Common Redshank nests, Northern Lapwing, Common Redshank and Black-headed Gull eggs in Black-tailed Godwit nests, as well as a Common Redshank egg in a Common Tern nest.

In Hungary, although a number of such cases have been published in Hungarian, they are mostly in hardly accessible papers and no comprehensive study has yet been made on incidents of interspecific brood parasitism, excluding the cases of the highly-specialized, obligate brood parasitic Common Cuckoo *(Cuculus canorus)*. Although I could not distinguish between facultative brood parasitism and egg dumping (sensu Krakauer & Kimball 2009), these accicental cases of mixed broods summarised in this study, complemented with my own observations, may facilitate future studies on brood parasitism and egg dumping.

Representatives of non-passerine families

Common Quail *(Coturnix coturnix)*

In Kéménd (today Kamenín, Slovakia), in the year 1900 (undated record) a nest was found while mowing alfalfa *(Medicago sativa)*, which contained 5 Grey Partridge *(Perdix perdix)*

and 3 Common Quail *(Coturnix coturnix)* eggs. A Quail was flushed from the nest, but despite this, it was definitely a Grey Partridge nest that had been parasitised by a Quail (Étter 1900). The destroyed egg collection of the Hungarian Natural History Museum contained a Western Marsh-harrier *(Circus aeruginosus)* nest collected at Ürbő on 16 May 1907 with 4 harrier eggs and a Common Quail egg (Fuisz *et al.* 2015).

Common Pheasant *(Phasianus colchicus)*
On 21 May 1970, I found 5 Common Pheasant eggs in a 20-egg Grey Partridge nest in a freshly mown alfalfa field between Budapest and Ecser. András Czwalinga collected a 7-egg Mallard *(Anas platyrhynchos)* nest on 18 June 1971 at Fülöpszállás, which also contained a Common Pheasant egg (Faragó *et al.* 2015). Between 1974–1978, László Molnár checked 20 Gadwall *(Mareca strepera)* nests in the gull colony island of Lake Csaj, and found a Common Pheasant egg among ten Gadwall eggs in one of the nests. He also found a Garganey *(Spatula querquedula)* nest with 8 duck eggs in Pusztaszer on 4 May 1978, and this nest already contained three Common Pheasant eggs on 16 May (Haraszthy 2019b). Rozgonyi (2000) also found 3 Common Pheasant eggs in a five-egg Mallard nest at Karancslapujtő on 24 April 1999. On 3 May 2000, Pál Marik observed a Common Pheasant egg in a 12-egg Northern Shoveler *(Spatula clypeata)* nest in the Tavasz Meadow next to Gyula, and on 9 May, he found another Common Pheasant egg in a 9-egg Northern Shoveler nest in the same area.

Greylag Goose *(Anser anser)*
With Elemér Futó, we found two Greylag Goose eggs next to the four eggs of a Mute Swan *(Cygnus olor)* nest in Kis-Balaton on 5 May 2005 *(Photo 1)*. On 11 April 2018, I found 5 swan eggs and 2 Greylag Goose eggs in a Mute Swan nest in the Csíkvarsai Meadow at Csákvár *(Photo 2)*. On 18 April 2018, Ádám Selmeczi Kovács and I checked a Whooper Swan *(Cygnus cygnus)* nest in the Ipoly Valley, and found a Greylag Goose egg with the 6 swan eggs *(Photo 3)*.

Common Pochard *(Aythya ferina)*
On 15 June 1959, Wolfgang Makatsch found a 9-egg Ferruginous Duck *(Aythya nyroca)* nest at Lake Fehér by Szeged, which also contained 2 Common Pochard eggs (Haraszthy et *al.* 2015b). László Molnár also observed a Common Pochard egg in a 13-egg Ferruginous Duck nest found at Lake Csaj on 4 June 1978 (Haraszthy 2019b).

Tufted Duck *(Aythya fuligula)*
On 24 May 2005, Elemér Futó and I surveyed the duck nests on an island of Kis-Balaton. We found two Gadwall nests that contained Tufted Duck eggs, distributed as follows: 11 Gadwall eggs with 3 Tufted Duck eggs and 9 Gadwall eggs with 5 Tufted Duck eggs *(Photo 4, 5)*.

Ferruginous Duck *(Aythya nyroca)*
László Máté found an 8-egg Common Pochard nest with a Ferruginous Duck egg at Rétszilas on 23 May 1951 (Haraszthy & Viszló 2015). On 4 and 8 June 1978 at Lake Csaj, László

Molnár found two 8-egg Common Pochard nests. Each had a Ferruginous Duck egg in it (Haraszthy 2019b). On 23 May 2004, the 7-egg Common Pochard nest I checked in the Sikota marsh near Dinnyés also contained a Ferruginous Duck egg *(Photo 6)*. Molnár (2000) found a Ferruginous Duck egg in each of five Gadwall nests, in a Common Pochard nest and in a Black-headed Gull nest at Lake Csaj. On 21 May 2015, I photographed 2 Ferruginous Duck eggs next to 4 Mallard eggs in a nest of the latter species at Apaj *(Photo 7)*. On 16 May 2011, I checked the gull colony island at Rétszilas, and found a probable Ferruginous Duck egg in a 2-egg Black-headed Gull clutch *(Photo 8)*. On 16 May 2017, I checked a three-egg Black-headed Gull nest on a tiny island of the Rétszilas Fishponds, and found a Ferruginous Duck egg in it, as well as another nest with two Black-headed Gull eggs and two Ferruginous Duck eggs *(Photo 9, 10)*.

Mallard *(Anas platyrhynchos)*
On 7 May 2018, a 7-egg Red-crested Pochard *(Netta rufina)* nest found in Kis-Balaton also contained two Mallard eggs *(Photo 11)*, and I also found a Mallard egg in a 9-egg Gadwall nest *(Photo 12)*.

Gadwall *(Mareca strepera)*
On 24 May 2005, Elemér Futó and I checked duck nests on an island of Kis-Balaton.
We found two Tufted Duck nests that also contained Gadwall eggs in the following distribution: Tufted Duck 8 / Gadwall 3, Tufted Duck 12 / Gadwall 6 eggs *(Photo 13, 14)*.

Great Crested Grebe *(Podiceps cristatus)*
In 2009, János Perényi photographed a Whiskered Tern clutch in Lake Tisza, which contained two tern eggs and two Great Crested Grebe eggs *(Photo 15)*.

Black-necked Grebe *(Podiceps nigricollis)*
On 16 July 1996, Levente Viszló and I checked the Whiskered Tern/Black-necked Grebe colony established in the Zámolyi Reservoir. In two of the Whiskered Tern nests, there was a Black-necked Grebe egg alongside three tern eggs *(Photo 16, 17)*.

European Turtle Dove *(Streptopelia turtur)*
In summer 1947, during his study carried out in the Gellért Hill, Budapest, Tomasz (1955) found two fresh European Turtle Dove eggs next to the two strongly incubated eggs of Eurasian Collared Doves *(Streptopelia decaocto)* in their nest. He assumed that the Turtle Dove smuggled her eggs into the Collared Dove nest, but he did not exclude the possibility that the Turtle Dove chose to lay her two eggs in an abandoned, two-egg Collared Dove nest. The latter case, however, is nest parasitism rather than brood parasitism, as the Turtle Dove occupied an abandoned nest that still contained eggs.

Spotted Crake *(Porzana porzana)*
The destroyed egg collection of the Hungarian Natural History Museum contained a Black Tern/Spotted Crake clutch, which contained one egg from each species (Fuisz *et al.* 2015).

Common Moorhen (*Gallinula chloropus)*
On 13 May 1962, the 4-egg Little Grebe *(Tachybaptus ruficollis)* nest found by László Ocsovszky at Algyő also contained a Common Moorhen egg (Haraszthy 2015). On 23 May 2004, I found 3 Common Moorhen eggs in an 8-egg Mallard nest in the Sikota marsh at Dinnyés. On 3 June 1962, Jenő Radetzky found a 3-egg Little Bittern clutch with a Common Moorhen egg (Solti 2012). On 10 June 1979, Rékási (1980) found Little Bittern nests under three of the Purple Heron nests in the marsh at Madaras, one of which contained three white Little Bittern eggs and three speckled Common Moorhen eggs. On 29 May 2005, the nest I found in the reedbelt of the Hortobágyi-Fishponds had five Little Bittern eggs and a Common Moorhen egg (Haraszthy 2018).

Eurasian Coot *(Fulica atra)*
On 18 May 2017, I checked 191 Black-headed Gull nests out of approximately 500–600 at Fülöpszállás. One of the two-egg Black-headed Gull nests also contained one Eurasian Coot egg *(Photo 18)*. At the same place, the two-egg Black-headed Gull nest that had also one Eurasian Coot egg when Mihály Nyúl had found it, I saw two gull nestlings and one Eurasian Coot egg.

Black-winged Stilt *(Himantopus himantopus)*
On 5 June 2008, in the breeding colony established on a reef of Lake Fertő at Dinnyés, I observed 3 Black-winged Stilt eggs in a 2-egg Common Tern *(Sterna hirundo)* nest *(Photo 19)*. On 11 May 2015, I checked six Black-headed Gull nests and four Black-winged Stilt nests in the vicinity of Fülöpszállás. In one of the 2-egg Black-headed Gull nests, there was also a Black-winged Stilt eggs *(Photo 20)*.

Little Ringed Plover *(Charadrius dubius)*
On 22 July 2006, a Little Tern *(Sternula albifrons)* incubated one egg of its own and two eggs of a Little Ringed Plover in a „nest" within the Little Tern colony established on a gravel reef of the Dráva River *(Photo 21),* On 5 June 2008, in the breeding colony formed on a reef of Lake Fertő at Dinnyés, there was a Little Ringed Plover egg in one of the two-egg Common Tern nests *(Photo 22)*.

Collared Pratincole *(Glareola pratincola)*
Radetzky (1927) found a two-egg Collared Pratincole nest in Ürbő, which also contained one Kentish Plover egg.

Black-headed Gull *(Larus ridibundus)*
Between 1990 and 1996, Széll & Bakacsi (1996) found 1-3 Black-headed Gull eggs on five occasions in Mediterranean Gull *(Larus melanocephalus)* nests checked in Hungary. On 11 May 2015, I checked six Black-necked Grebe nests at Fülöpszállás. In one of the 4-egg nests, I also found a Black-headed Gull egg *(Photo 23)*.

Mediterranean Gull *(Larus melanocephalus)*
On 6 May 1971, Péter Beretzk also found a Mediterranean Gull egg in a two-egg Black-headed Gull nest (Széll & Bakacsi 1996).

White-winged Tern *(Chlidonias leucopterus)*
In the destroyed egg collection of the Hungarian Natural History Museum, there was a Common Tern/White-winged Tern nest with one egg of each species. The nest had been collected at Lake Velence on 20 May, 1894 (Fuisz *et al.* 2015).

Common Tern *(Sterna hirundo)*
On 5 June 2008, in the breeding colony formed on an island of Lake Fertő at Dinnyés, there was two Common Tern egg in one of the 3-egg Black-winged Stilt nests *(Photo 24)*.

Passerine species

Song Thrush *(Turdus philomelos)*
On 30 June 1987, Novák (1989) found three Song Thrush eggs alongside the four eggs of a Blackbird *(Turdus merula)* in the nest of the latter, in County Veszprém. The Blackbirds raised four nestlings that successfully fledged: one of them was their own and three were Song Thrushes *(Photo 25)*.

Cases of apparent interspecific brood parasitism that in reality were occupations of inhabited nests

In species that breed in nestholes, nestboxes or twig nests, it may occasionally happen that after occupying the nest and laying one or more eggs, they are chased off by another species that in turn starts to breed there. In species that breed in nestholes or nestboxes, the eggs of the former occupants almost always remain in the nest, while in those that breed in twig nests, it happens more rarely that the new owners do not throw out the eggs, and just lay their own next to those of the original occupant. Such clutches often obviously consist of the eggs of two species, nevertheless, they cannot be regarded as classic cases of interspecific brood parasitism, as they are, in fact, the result of nest parasitism.

Hooded Crow *(Corvus cornix)* – **Common Kestrel** *(Falco tinnunculus)*
It has long been known that Common Kestrels have a preference to breed in nests built and finely lined by Hooded Crows. Sometimes, the crow has already laid one or a few eggs by the time the Common Kestrel pair turns up and starts to mob and chase the crows until they desert their nest. In such cases, the Common Kestrels do not always push out the crow eggs, and in nests with a deeper cup they would not even be able to do so, so they simply lay their own eggs next to them. In such nests, the greenish crow eggs with grey pattern can easily be distinguished by anyone from the reddish Kestrel eggs. These, however, are not from brood

parasitism, but from a nest takeover. Such cases occurred in the past and with all certainty happen, even though rarely but regularly, in the present. As Hooded Crows are regularly shot down, it is not known how often this happens in nests that lose their owners due to this reason, but in all likelihood it happens more frequently than the cases that come to light.

In the destroyed egg collection of the Hungarian Natural History Museum, there was a four-egg Common Kestrel clutch collected at Csömör on 4 May 1906, which also contained a Hooded Crow egg (Fuisz *et al.* 2015). The egg collection of Dezső Radetzky in the Hungarian Natural History Museum contains a four-egg Common Kestrel clutch collected by him at Tárnok on 5 May 1928, which also contains a Hooded Crow egg (Haraszthy *et al.* 2015a).

In the last decades, nestboxes have been erected for Common Kestrels throughout Hungary, as well as for Red-footed Falcons *(Falco vespertinus)* in groups large enough for colonial breeding of this latter species. Common Kestrels readily occupy solitary nestboxes as well as boxes erected in smaller groups or colonies. It happens regularly that the Kestrels lay one or more eggs and then a pair of Western Jackdaws pick out their nestbox and harass the Kestrels until they desert it. In such cases the Kestrel eggs remain in the box and the Jackdaws lay their own next to them *(Photo 26)*. If in the vicinity, sometimes just a few metres away, there is an empty box, the Kestrels often occupy that, otherwise they make another breeding attempt further away. However, the reverse may also happen, when Kestrels take over the nestbox from Jackdaws. In both cases, despite appearances, it is a takeover of the nestbox and not brood parasitism.

Long-eared Owl *(Asio otus)* – **Red-footed Falcon** *(Falco vespertinus)*
Since Red-footed Falcons start breeding rather late, instead of corvids they compete with Long-eared Owls for a good nest or nestbox. On 15 June 1988, Red-footed Falcons were breeding in a nest built by Hooded Crows on a tree by the Kösely canal near Nagyiván in the Hortobágy. The Red-footed Falcons were incubating their own 3 eggs and one Long-eared Owl egg *(Photo 27)*.

Long-eared Owl *(Asio otus)* – **Common Kestrel** *(Falco tinnunculus)*
The nestboxes erected for Common Kestrels and Red-footed Falcons are regularly occupied by Long-eared Owls, too. Sometimes, the falcons chase the owls off when the latter already have eggs or even a complete clutch and then the falcons use the box for breeding. Zsíros (2015) observed the occupation of a nestbox with a complete, three-egg clutch of Long-eared Owls by Common Kestrels. The Kestrels laid six eggs next to the owl eggs. Again, this case was not brood parasitism, but nest(hole) parasitism *(Photo 28)*.

Common Kestrel *(Falco tinnunculus)* – **Eurasian Hobby** *(Falco subbuteo)*
The Eurasian Hobby is a late breeder, and often tries to occupy already inhabited nests. It is probably successful in the large majority of cases. In 2015, a pair of Common Kestrels occupied a nestbox erected on a transmission tower near Monor. The female had already laid her first egg, when a pair of Eurasian Hobbies turned up and chased away the Kestrels in three days. They raised two nestlings from their three eggs, but the Kestrel egg had addled.

In 2016, a Saker Falcon laid an infertile egg in the same box and later abandoned it. Afterwards, Common Kestrels occupied the nestbox and the female laid three eggs, but once again, the Hobbies chased away the Kestrels (Schwartz 2019).

Common Buzzard *(Buteo buteo)* – **Northern Goshawk** *(Accipiter gentilis)*
In the Eastern Mecsek Hills on 21 April 1950, Szilárd Cseresnyés collected a clutch consisting of one egg each of Northern Goshawk and Common Buzzard (Faragó *et al.* 2015). In this case, it is not possible to determine whether the Goshawk occupied a one-egg Buzzard nest and began to lay her own eggs in it, or perhaps the Buzzard smuggled an egg into the Goshawk nest. Considering the balance of forces between the two raptors, the first version is more likely.

Eurasian Scops Owl *(Otus scops)* – **European Roller** *(Coracias garrulus)*
Nowadays, nearly 3000 nestboxes support the establishment of pairs and the successful breeding of European Rollers in Hungary (Kiss & Tokody 2017). These nestboxes, however, are suitable for other species, too, moreover, Rollers start breeding rather late, and this favourable opportunity is often exploited by Common Starlings *(Sturnus vulgaris)* and Eurasian Scops Owls. On several occasions, the Scops Owls had already laid 2-3 eggs in the box, which was at that stage occupied by Rollers and the female Roller laid her eggs, too. Rollers do not throw out Scops Owl eggs from the nestbox, but incubate them along with their own. When the eggs hatch, they cannot feed the owl chicks, which consequently die *(Photo 29)*. One occasion is also known when an abandoned Roller nest with two eggs was occupied by Eurasian Scops Owls (Haraszthy 2019b).

Common Starling *(Sturnus vulgaris),* **Eurasian Tree Sparrow** *(Passer montanus)* – **European Roller** *(Coracias garulus)*
Common Starlings and Eurasian Tree Sparrows regularly nest in Roller boxes. Although Rollers return late from their wintering grounds, these species may still be breeding then. The Rollers regularly chase away the smaller birds, throw out their nestlings and start breeding in the nestbox thus occupied. Such cases, however, are considered as nest(hole) parasitism. In 2014, a pair of Little Owls *(Athene noctua)* bred in a Roller box near Apaj. When the nestlings fledged, Starlings occupied the box, but they got thrown out by Rollers that subsequently bred there successfully (Szász 2017).

Great Tit *(Parus major)* – **Eurasian Blue Tit** *(Cyanistes caeruleus)* – **Marsh Tit** *(Poecile palustris)*
Among tits that breed in nestboxes, both genuine brood parasitism and nest(hole) parasitism may occur. In a given case, the true situation can only be unambiguously determined if the box is checked and changes in the number of eggs is recorded on a daily basis. If the number of eggs of both species grows every day, either simultaneously or with a slight time lapse, then it is clearly a case of brood parasitism. But if a mixed brood is found only in the nestling stage, there is no opportunity to determine if brood parasitism or nest(hole) parasitism has taken place.

In Hungarian nestbox schemes, Great Tits and Blue Tits have been observed several times to lay their eggs in the same box. Normally, the nestlings of both species fledge from these mixed broods, which means the adults raise the nestlings of the other species, too. In the Kamaraerdő, Budapest, on 23 May 1993, a nestbox held six Blue Tit and six Great Tit nestlings about to fledge, which were all fed by Blue Tits (Éles 1993). On 7 May 2015, Andrési (2016) found 8 Great Tit and 10 Blue Tit eggs in a nestbox at Ásotthalom; all Great Tits and one Blue Tit fledged later successfully, raised by Great Tits. Sándor Rozgonyi found a „shared" nest of Blue Tits and Great Tits with 18 eggs at Karancslapujtő on 25 April 2000, and 4 days later there were already 22 eggs in the nest. On 15 May, the nest contained 12 Great Tit nestlings with sheathed feathers, and after their fledging, he found eight Blue Tit eggs sunk in the nesting material. In this case, too, the likely solution is that the eight, and for some reason infertile, Blue Tit eggs were abandoned and the Great Tit laid her clutch on them. János Dénes found a Great Tit nestling alongside a clutch of six Blue Tit eggs in the Börzsöny Hills on 11 May 2009. All nestlings fledged successfully.

At Hidegkút, Tóth-Almási (2007) observed Marsh Tits attending a nestbox, but the birds disappeared after egg-laying. Then the box was occupied by Blue Tits, the female laid her eggs, incubated, and the pair raised the nestlings successfully, among which there were five Marsh Tit nestlings along with their own six offspring *(Photo 30)*. This case was unambiguously nest(hole) parasitism.

Great Tit *(Parus major)* – **Eurasian Nuthatch** *(Sitta europaea)*
On 24 April 2017, I checked a Nuthatch nest in the Börzsöny Hills, which contained 4 Great Tit and 5 Nuthatch eggs. Green moss was visible in the nest base, which is typical of Great Tits. Presumably, the Nuthatches took the hole from the Great Tits, or perhaps the Tits deserted it. The Nuthatches constructed their typical nest of bark pieces and began to lay their own eggs. Again, this was not a case of brood parasitism, but of nest(hole) parasitism *(Photo 31)*.

Eurasian Tree Sparrow *(Passer montanus)* – **Great Tit** *(Parus major)*
In 2018, Eurasian Tree Sparrows bred in a log nestbox in Nagyhódos. One addled egg remained in the nest after the nestlings fledged. The box was occupied by Great Tits for the second breeding. They constructed their own nest and laid their eggs, while the addled Tree Sparrow egg still remained there and was continuously incubated by the Great Tits. Once again, this case of a remnant egg from the previous breeding of a different species is not brood parasitism, even though it may seem so at first sight on the basis of the clutch shown in the photograph *(Photo 32)*.

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Photo 1. Four Mute Swan eggs with two Greylag (*) eggs
1. fotó Bütyköshattyú-tojások mellé rakott két nyárilúd-tojás

Photo 2. Five Mute Swan eggs with two Greylag (*) eggs
2. fotó Bütyköshattyú-tojások mellé rakott két nyárilúd-tojás

Photo 3. Six Whooper Swan eggs with one Greylag (*) egg
3. fotó Énekeshattyú-tojások mellé rakott nyárilúd-tojás

Photo 4. 11 Gadwall eggs with tree Tufted Duck (*) eggs
4. fotó Kendermagosréce-fészekbe rakott három kontyosréce-tojás

Photo 5. Nine Gadwall eggs with five Tufted Duck (*) eggs
5. fotó Kendermagosréce-fészekbe rakott öt kontyosréce-tojás

Photo 6. Seven Common Pochard eggs with one Ferruginous Duck (*) egg
6. fotó Barátréce-fészekbe rakott cigányréce-tojás

Photo 7. Four Mallard eggs with two Ferruginous Duck (*) eggs
7. fotó Tőkésréce-fészekbe rakott két cigányréce-tojás

Photo 8. Two Black-headed Gull eggs with one Ferruginous Duck (*) egg
8. fotó Dankasirály-fészekbe rakott cigányréce-tojás

Photo 9. Tree Black-headed Gull eggs with one Ferruginous Duck (*) egg
9. fotó Dankasirály-fészekbe rakott cigányréce-tojás

Photo 10. Two Black-headed Gull eggs with two Ferruginous Duck (*) eggs
10. fotó Dankasirály-fészekbe rakott két cigányréce-tojás

Photo 11. Seven Red-crested Pochard eggs with two Mallard (*) eggs
11. fotó Üstökösréce-fészekbe rakott két tőkésréce-tojás

Photo 12. Nine Gadwall eggs with one Mallard (*) egg
12. fotó Kendermagosréce-fészekbe rakott tőkésréce-tojás

Photo 13. Eight Tufted Duck eggs with tree Gadwall (3) eggs
13. fotó Kontyosréce-fészekbe rakott három kendermagosréce-tojás

Photo 14. 12 Tufted Duck eggs with six Gadwall (*) eggs
14. fotó Kontyosréce-fészekbe rakott hat kendermagosréce-tojás

Photo 15. Two Whiskered Tern eggs with two Great Crested Grebe (*) eggs (Photo: János Perényi)
15. fotó Fattyúszerkő-fészekbe rakott két búbosvöcsök-tojás (Fotó: Perényi János)

Photo 16. Tree Whiskered Tern eggs with one Black-necked Grebe (*) egg
16. fotó Fattyúszerkő-fészekbe rakott feketenyakúvöcsök-tojás

Photo 17. Tree Whiskered Tern eggs with one Black-necked Grebe (*) egg
17. fotó Fattyúszerkő-fészekbe rakott feketenyakúvöcsök-tojás

Photo 18. Two Black-headed Gull eggs with one Eurasian Coot (*) egg
18. fotó Dankasirály-fészekbe rakott szárcsatojás

Photo 19. Two Common Tern eggs with tree Black-winged Stilt (*) eggs
19. fotó Küszvágócsér-fészekbe rakott három gólyatöcs-tojás

Photo 20. Two Black-headed Gull eggs with one Black-winged Stilt (*) egg
20. fotó Dankasirály-fészekbe rakott gólyatöcs-tojás

Photo 21. One Little Tern egg with two Little Ringed Plover (*) eggs
21. fotó Kiscsér-tojás mellé rakott két kislile-tojás

Photo 22. Two Common Tern eggs with one Little Ringed Plover (*) egg
22. fotó Küszvágócsér-fészekbe rakott kislile-tojás

Photo 23. Four Black-necked Grebe eggs with one Black-headed Gull (*) egg
23. fotó Feketenyakúvöcsök-fészekbe rakott dankasirály-tojás

Photo 24. Tree Black-winged Stilt eggs with two Common Tern (*) eggs
24. fotó Gólyatöcs-fészekbe rakott két küszvágócsér-tojás

Photo 25. Four Blackbirds eggs with tree Song Thrush (*) eggs (Photo: László Novák)
25. fotó Feketerigó fészekbe rakott három énekesrigó-tojás (Fotó: Novák László)

Photo 26. Five Western Jackdaw eggs with one Common Kestrel (*) egg
26. fotó Vörös vércsétől elfoglalt odúba rakott csóka fészekalj

Photo 27. Tree Red-footed Falcon eggs with one Long-eared Owl (*) egg
27. fotó Kék vércse által foglalt fészekbe rakott erdeifülesbagoly-tojás

Photo 28. Six Common Kestrel eggs with tree Long-eared Owl (*) eggs (Photo: Sándor Zsíros)
28. fotó Vörös vércse által foglal költőládába rakott három erdeifülesbagoly-tojás (Fotó: Zsíros Sándor)

Photo 29. Tree European Roller chicks with one Eurasian Scops Owl (*) chick (Photo: Tamás Kiss)
29. fotó Szalakóták elfoglalták a füleskuvik által lakott odút és az abban lévő tojást is kikeltették a sajátjaikkal együtt (Fotó: Kiss Tamás)

Photo 30. Six Blue Tits nestlings with five Marsh Tit chick in one nest box (Photo: Péter Tóth-Almási)
30. fotó Kékcinege-odúba rakott barátcinege tojásokat is kikeltették a kékcinege-szülők és felnevelték valamennyi fiókát (Fotó: Tóth-Almási Péter)

Photo 31. Five Nuthatch eggs with four Great Tit (*) eggs
31. fotó Csuszka-fészekbe rakott négy széncinege-tojás

Photo 32. Six Great Tit eggs with one Eurasian Tree Sparrows (*) egg
32. fotó Mezeiveréb-költésből visszamaradt záp tojást a széncinegék nem távolították el, hanem mellé rakták saját tojásaikat

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