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The First Report and Preliminary Observations on Escaped Parrot Species (Psittaciformes) in Turkey through Citizen Science

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Abstract. The presence of non-native parrot species (Psittaciformes) is becoming increasingly obvious in many countries around the world. To establish their actual status in Turkey, a citizen science focused observation project was set up in 2006 to collect records of escaped parrots in several cities. Until now, nine new species have been identified: Cockatiel (*Nymphicus hollandicus*), Yellow-crested cockatoo (*Cacatua sulphurea*), Grey parrot (*Psittacus erithacus*), Senegal parrot (*Poicephalus senegalus*), Orange-winged amazon parrot (*Amazona amazonica*), Plum-headed parakeet (*Psittacula cyanocephala*), Eastern rosella (*Platycercus eximius*), Budgerigar (*Melopsittacus undulatus*) and Masked lovebird (*Agapornis personatus*). The project also includes two species already present for several decades and categorized as non-native resident, the Ring-necked parakeet (*Psittacula krameri*) and the Alexandrine parakeet (*Psittacula eupatria*) which are monitored. The presence of the nine new species is discussed in relation to legal regulations on trade and their natural distribution range.

Introduction

Invasive alien species (IAS) in general are one of the drivers of biodiversity loss, causing negative effects on native species and the environment. They are found all over the world and still extending to new areas, in most cases as a result of human activities (Lövei 1997). To reduce the introduction of invasive alien species in the future, preventive measures need to be implemented (NOBANIS 2015). More than 16% of all parrot species (Psittaciformes) have currently established at least one breeding population in areas outside their natural distribution ranges. For most of them, their influence on native species and their environment is still poorly known (Menchetti & Mori 2014). These introductions outside of their natural range may have widespread and unpredictable environmental and economic consequences (Dyer 2017). Psittaciformes could potentially affect economy and human wellness, being responsible for damage to crops and to electrical infrastructures. Many alien populations breed in urban parks or close to human settlements which causes noise pollution (Menchetti & Mori 2014). In countries where non-native exotic parrot species occur, their status is categorized as "invasive alien", "alien" or "escapes".

In Turkey the first Ring-necked parakeet (*Psittacula krameri*) was recorded in 1975 (Boyla et al. 1998), followed by the Alexandrine parakeet (*Psittacula eupatria*) in 1998 (Kirwan et al. 2008). Both were included in The Birds of Turkey Checklist with the status of "resident species" (exotic origin). Their area of distribution is expanding and their numbers increasing every year. If this trend continues in the future, their status of "alien" species should change into "invasive alien".

It is widely accepted that collection of biodiversity and environmental data by volunteers, now called "citizen science", contributes to our knowledge about the natural environment (Tweddle et al. 2012, Dickinson & Boney 2012). In Turkey, the database KuşBank (http://ebird.org/content/turkey/) was the first ornithological citizen science project in the country. Since birdwatchers started in 2004 submitting their observation records to this online database, it has played a very important role to increase the knowledge on bird distribution and their numbers in Turkey. Standardized monitoring of several specific species as Swift, White stork and of some common birds has been set up between 2003 and 2007. Unfortunately this scheme could not be continued due to several practical problems and the fact that not enough participants had a sufficient knowledge

Table 1. The escape status of the 9 parrot species which have been observed throughout Turkey: Cockatiel (*Nymphicus hollandicus*), Yellow-crested cockatoo (*Cacatua sulphurea*), Grey parrot (*Psittacus erithacus*), Senegal parrot (*Poicephalus senegalus*), Orange-winged amazon parrot (*Amazona amazonica*), Plum-headed parakeet (*Psittacula cyanocephala*), Eastern rosella (*Platycercus eximius*), Budgerigar (*Melopsittacus undulatus*) and Masked lovebird (*Agapornis personatus*) with vernacular species name (Species), number of individuals (N), status (S: R=only one observation, C=observed in captivity), observation date (Date), city and site (Locality), validation (V: P=record without pictures as proof, mostly records from less experienced observers, C=confirmed, with picture and from experienced birdwatchers) and observer name (Observer).

Species	N	S	Date	Locality	V	Observer
Cockatiel	3	R	01.07.2016	İstanbul, Silivri	P	Ayhan Erdemgüler
Cockatiel	1	R	13.06.2016	Samsun, Merkez	P	Hülya Akar
Cockatiel	1	C	05.01.2015	Yalova, Merkez	P	Ozan Kral
Cockatiel	1	C	10.07.1997	İstanbul, Bakırköy	P	Serkan Yaman
Yellow-crested cockatoo	1	R	07.07.1993	İstanbul, Etiler-Beşiktaş	C	Kerem Ali Boyla
Yellow-crested cockatoo	1	R	22.07.1992	İstanbul, Rumelihisarı	C	Kerem Ali Boyla
Grey parrot	1	C	21.08.2017	Bursa, Nilüfer	C	İbrahim Sargın
Grey parrot	1	C	31.03.2016	İstanbul, Maltepe	C	İnanç Sarı
Grey parrot	1	R	01.15.2016	İstanbul, Galata Kulesi	P	Şener Çelik
Grey parrot	1	C	14.02.1998	İstanbul, Altunizade	C	Nilay Tezsay
Senegal parrot	1	C	21.07.2017	Ankara, Çayyolu	C	Can Eray Aydemir
Senegal parrot	1	R	24.02.2017	İstanbul, YTU Davutpaşa	P	Duygu Eserdağ
Senegal parrot	1	R	20.01.2016	Ankara, Çankaya	C	Jose Tavares
Orange-winged amazon parrot	1	M	01.24.2017	Adana, Atatürk Park	C	Özgün Sözüer
Plum-headed parakeet	1	R	18.12.2016	İstanbul, Maçka Park	C	Kerem Ali Boyla
Eastern rosella	1	R	03.02.2012	İstanbul, Yıldız Parkı	C	Kerem Ali Boyla
Masked lovebird	1	R	18.06.2017	İstanbul, Küçük moda	C	Duygu Eserdağ
Budgerigar	1	R	07.11.2017	Şanlıurfa, Birecik	C	Soner Bekir
Budgerigar	1	M	17.11.2017	Antalya, Korkuteli	C	Şefik Yıldız
Budgerigar	1	R	04.09.2017	Antalya, Korkuteli	C	Şefik Yıldız
Budgerigar	2	R	09.07.2017	Yalova, Merkez	C	Ozan Kral
Budgerigar	1	R	11.10.2016	Antalya, Merkez	C	Nilay Güler
Budgerigar	1	C	05.10.2013	İstanbul, Sabiha Gökçen	C	Nilay Tezsay
Budgerigar	1	R	04.05.2002	İstanbul, Silivri	P	Ayhan Erdemgüler

to recognize a set number of species. However from 2013 on the new European Breeding Bird Atlas (EBBA2) project presented a new opportunity to train volunteers and increase their skills for bird identification to collect data for the Turkish contribution to this international project. But this is a long-term investment and does not yet involve a large number of participants.

Species as Ring-necked parakeet and Alexandrine parakeet however, which are mainly present in urbanized areas, are very suitable for a citizen science project. They are both charismatic and sufficiently known by the general public and hereby have a much higher potential for citizen involvement. With more people involved, there is not only a better coverage of both species but also a higher chance to detect new non-native escapes. To that goal, a volunteer census network for parakeets was established in 2016.

Methodology

The Parakeet Census of Turkey has been widely promoted through the national press and various other media. The interest for collaboration was high. Since 2016 about 820 observers have participated in the project. Records could be filled in on a simple standardized Google Sheet document via Google Drive that was originally created for the monitoring of Ring-necked and Alexander parakeet but was occasionally also used to record observations from escapes. However, most records from escapes were submitted directly via email. In order to increase the reliability of the

observations, observers were asked to submit their records with photographic evidence. Species recordings supported by photographs and/or seen by experienced birdwatchers were classified as confirmed; species records not supported by photographs were classified as probable recordings (see Table 1).

Results

Table 1 shows data from nine species from records submitted within the project since 2016 completed with 24 additional random observations. None of this species has been observed as breeding and most of them have been recorded only once. They have been classified as "escapes".

The escaped species records came from Adana (1), Ankara (2), Antalya (3), Bursa (1), Istanbul (13), Samsun (1), Şanlıurfa (1) and Yalova (2) (Figure 1–2). Especially the city parks and woods in Istanbul are hosting these exotic species.

Discussion on trade and origin of the escapes

A total of 9 escape parrot species were reported from Turkey between 1992 and 2017. The most common species is the Budgerigar. Fifteen observations reported by citizens and birdwatchers are confirmed, and 9 considered as probable. Fourteen birds were not seen again on the site of their first observation, 2 birds were seen again and 6 birds were observed as caged.

There are legal regulations on wildlife trade in Turkey. The Department of Hunting and Wildlife Service of the Ministry of Forestry and Water Affairs is working on this issue. All parrot species are subject to the treaty of CITES except Rosy-faced lovebird (*Agapornis roseicollis*), Cockatiel and Ring-necked parakeet. Currently 52 parrot species are traded in Turkey, of which 54% are Psittaculidae, 36% Psittacidae, and 10% belonging to the family Cacatuidae. Species with the highest level of import in Turkey are Fischer's lovebird (*Agapornis fischeri*), Grey parrot, Crimson rosella (*Platycercus elegans*) and Eastern rosella (*Platycercus eximius*). The Budgerigar is the most imported bird species that is kept as pet. According to the 2013–2014 annual illegal trade report which the Ministry has prepared for CITES, a total of 2000 illegal cases concern Orange-winged Amazon, Fischer's lovebird, Grey parrot, White cockatoo (*Cacatua alba*) and Ring-necked Parakeet.

The most traded species in the world are Rosy-faced lovebird, Fischer's lovebird, Masked lovebird, Grey parrot, Senegal parrot and Monk parakeet (*Myiopsitta monachus*) (CITES Secretariat 2012).

The most common domestic parrot species are Cockatiel, Grey parrot and Crimson rosella (Evcilkuşlar 2017). The cheapest parrot species are Budgerigar, Peach-faced lovebird, Fischer's lovebird and Cockatiel.

African Grey parrot is native to equatorial Africa. This species has become a very popular pet, largely due to their attractive appearance and their ability to mimic human speech. They can be very easily captured. Large numbers of African greys have been taken from the wild. This large-scale capture coupled with significant habitat loss and the species' low reproductive rate has led to

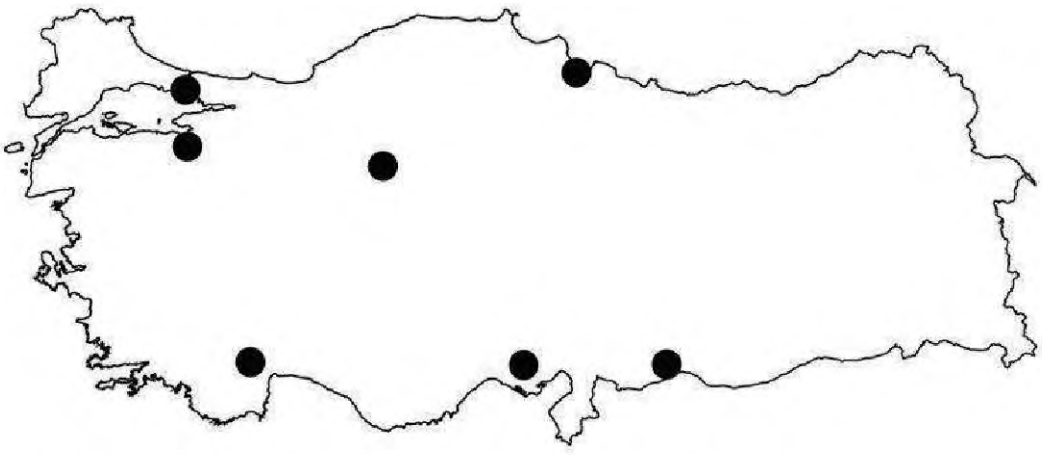
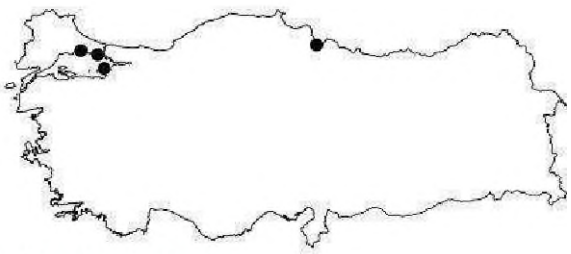
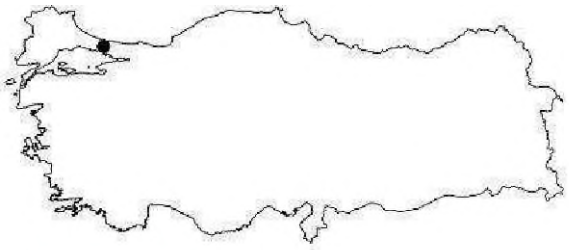


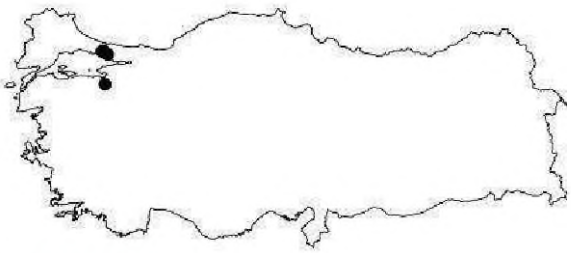
Figure 1. Dots indicate Turkish cities where parrot species have been observed.



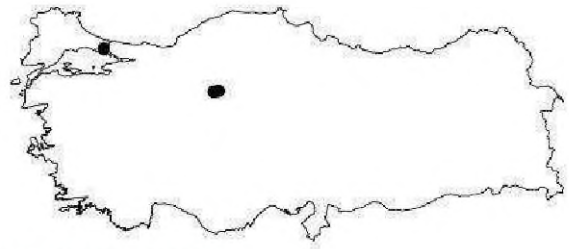
a. *Nymphicus hollandicus*



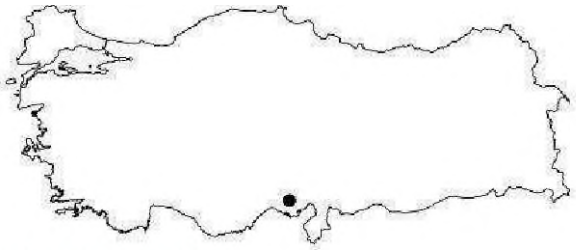
b. *Cacatua sulphurea*



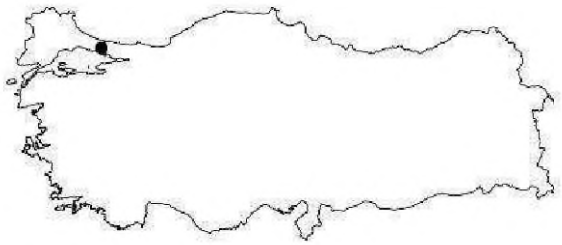
c. *Psittacus erithacus*



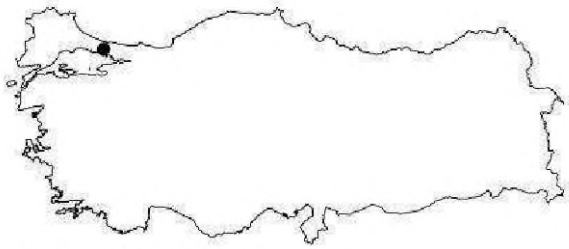
d. *Poicephalus senegalus*



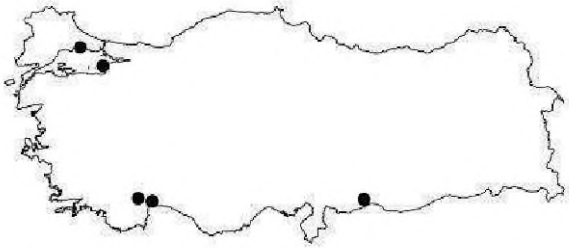
e. *Amazona amazonica*



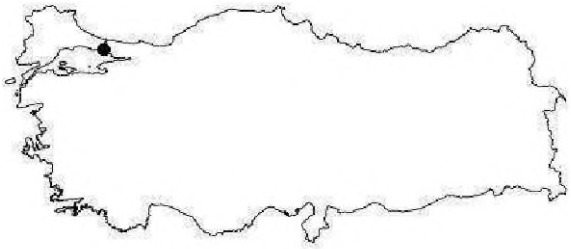
f. *Psittacula cyanocephala*



g. *Platycercus eximius*



h. *Melopsittacus undulatus*



i. *Agapornis personatus*

Figure 2 a–i. Dots indicate observation sites of the different parrot "escapes" in Turkey.

a collapse and fragmentation of the wild populations throughout the species historic range, with declines exceeding 90% in some countries (Environment and Climate Change Canada 2017).
In 2017 Grey parrot was included in the Appendix I list of CITES. This resulted in a ban of the global trade, also in Turkey. The species was one of the most imported parrots in the country and a very popular pet. In spite of the ban, it is still smuggled illegally into Turkey. The Ministry of Forestry and Water Affairs is active to prevent these illegal trade.

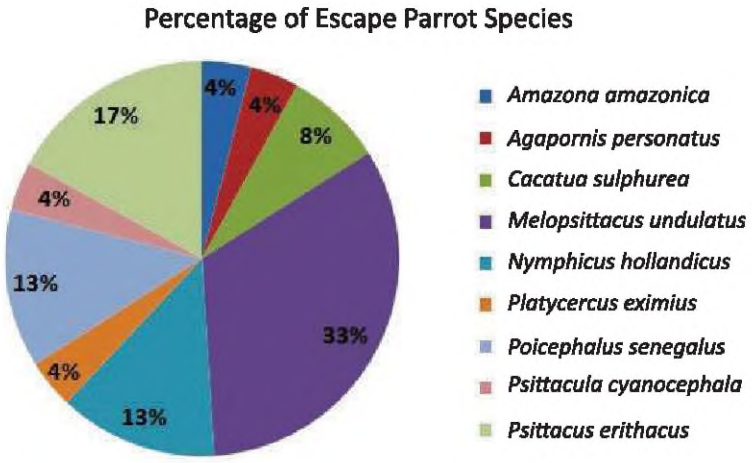


Figure 3. Percentage of number of observations on the total observations for nine species observed as "escapes": 4 species of Psittaculidae, 3 species of Psittacidae, and 2 species belonging to the family of Cacatuidae. Budgerigar is the most observed species, Orange-winged amazon parrot, Masked lovebird and Eastern rosella the lesser observed.

Table 2. Summary of trade status of some of the escapes that have been observed during the project

	Most traded in the World	Most imported in Turkey	Most common in pet bird statistics in Turkey	Cheapest in Turkey	Most common cage escape in Turkey
1	Peach-faced lovebird	Fischer's lovebird	Cockatiel	Peach-faced lovebird	Grey parrot
2			Grey parrot	Fischer's lovebird	Cockatiel
3	Masked lovebird	Crimson rosella	Crimson rosella	Cockatiel	Senegal parrot

The natural range of the Senegal parrot is Senegal and surrounding countries. It has been observed in the Netherlands, England, Spain, Portugal, Puerto Rico, and Greece (eBird 2017). The Senegal parrot is listed in the CITES Annex 2 list. It is a species that is highly traded in the world (CITES Secretariat 2012). It is not frequently imported in Turkey nor popular as pet, hence it is remarkable that the last two years, the Senegal parrot has been recorded as escape in Istanbul and Ankara. The species should be monitored in Turkey in the future.

The Budgerigar is a native species in Australia. It has been observed in England, France, Spain, Belgium, the Netherlands and Israel (eBird 2017). In Turkey the species is recorded almost exclusively in the spring and summer months. The most interesting observation of the Budgerigar comes from Antalya where in October 2017 a couple was observed in the Korkuteli district at an altitude of 1070 meters. The male disappeared after two weeks but the female could be observed during two months. At night, this specific female was seeking cover in the parasitic mistletoe (*Viscum album*) on wild Oleaster-leafed pear (*Pyrus elaeagrifolia*) and in woodpeckers' nests during daytime. Mistletoe is distributed throughout Asia and Europe and is known to be toxic. Hence, it is very unusual that this individual chose to use these plants as a roost. It is thought that Mistletoe offers protection from cold, predators and other environmental threats. If this individual survives, it would be the first Budgerigar wintering in Turkey.

The Orange-winged amazon parrot is a native species in the Amazon bassin and has been observed in Portugal and Spain (Mori et al. 2017). One individual has been observed in the Atatürk park of Adana for more than two years. As there are reports of illegal smuggling of the Orange-winged amazon in Turkey, the monitoring of this species should be continued.

Conclusion

There is a low probability that an solitary escape may survive the weather conditions, find a partner and establish a population. The release of a large number of exotic birds belonging to the same species into the same environment is something else. The history of Ring-necked parakeet, nowadays very common in Istanbul, is unique for Turkey. These parakeets were released at Atatürk Airport in 1997 and have subsequently spread

out, started breeding and form now a substantial population. Such release actions could also occur with other non-native parrot or parakeet species. The census project is therefore of great importance to detect these activities and take proper actions.

A majority of the introduced species does not become invasive and cause problems in their new environment. But if they do this can have significant environmental, economic and public health impacts and present a significant risk of a wholesale homogenization of ecosystems (Genovesi & Shine 2004). Even though a breeding population has not yet been reported, the "escape" parrot species occur already in various locations all over Turkey. Problems caused by these species have not been identified yet. In the future continuous monitoring will be needed to find out if they will become "resident species" such as the Ring-necked and the Alexandrine parakeet. Therefore, it is important that the monitoring of exotic parrot species through citizen science will be continued in Turkey.

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