AVIATION SAFETY RANKING VALUES AND BIRD SPECIES
AT TRABZON INTERNATIONAL AIRPORT, TÜRKİYE

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The study investigated bird species at Trabzon International Airport (TIA) in Türkiye and their Aviation Safety Ranking Values (ASRV). During the study period between February 2021 and February 2022, 75 observations were carried out using direct and indirect observation methods (camera traps, bird nests, eggs, feathers and; pellets) to identify species. As a result, 109 bird species were identified belonging to 39 families. Migration status of the observed birds ranged from overwintering (27), to summer visitors (26), residents (17), wintering and passage migrants (14), passage migrants (9), residents and wintering (8), residents and summer visitors (5), and residents and passage migrants (3). The bird hazard ranking system is based on bird size, average weights, flocking characteristics, and flight behaviour. According to the criteria of the ASRV, a total of 36 bird species at TIA with hazard levels of intermediate (3), high (4), and very high (5) were determined. Among the species identified, 25 weighed between 700 and 2200 grams. Wildlife professionals should be assigned to all airports to successfully control bird strikes and increase flight safety, and bird observations should be performed regularly.

Key words: bird strike, flight safety, ASRV, bird observation, airport.

INTRODUCTION

As air traffic shares the sky with birds, the mutual risks to aircraft and birds is increasing. With heavy air traffic, there has been an increasing rate of collisions between planes and birds. These collisions threaten both human life and birdlife and cause severe economic damage to aircrafts. Bird strikes cause deaths worldwide and a significant economic loss estimated at an average cost of approximately 1.2 billion dollars per year (Allan 2002). The European Union Aviation Safety Agency (EASA) has determined the average cost of bird strikes in the civil aviation sector in Europe to be about 1 billion Euros per year (Maragakis 2009). As air transportation has gained significant momentum, the necessity of controlling wildlife that threatens flight safety has increased significantly.

Birds cause the most accidents and malfunctions in air traffic among wild animals. Around the world, nearly 450 people and thousands of birds have lost their lives due to bird strikes, and severe economic damage has been
inflicted on 180 civil aircrafts and nearly 500 military aircraft (Shobakin 2009). Between 1960 and 2004, 255 civilians and thousands of birds died due to bird strikes worldwide, and serious economic losses occurred in 122 civilian aircrafts. Over 150 military personnel lost their lives in the same period due to bird strikes, and nearly 350 military aircrafts were destroyed (Shobakin 2009). The International Civil Aviation Organization (ICAO) states that nearly 90% of bird strikes occur during landing or take-off (ICAO 2018). During these phases, the engines run at maximum power, causing mass deaths at low altitudes (Dukiya & Gahlot 2013). Green areas, rocks, and runway lighting at night, all of which are preferred by birds, are very attractive for both migratory species and resident birds (Mallord et al. 2007). Since airports are the preferred habitats of birds with their food sources, this leads to flight safety problems. The green areas along the runway and around the airport that birds prefer effectively attract birds (ICAO 1987, Robinson 2005). The bird species most often encountered at airports are mainly herbivores/seedeaters (ducks, geese, and some sparrow species), insectivorous species, corvids, and gulls. There may also be raptors and herons, depending on the presence of amphibians or small mammals (Barras & Dolbeer 2000, Gleizer et al. 2005). One factor increasing the potential risks to flight safety is when the airports are located on bird migration routes. Despite preventive efforts at airports, the risk of bird strikes still cannot be eliminated (Blokoel 1976). Besides, the width of bird migration routes makes it difficult to take some measures.

In the last 15 years, the number of passengers in civil air transport has increased by 261% worldwide, the number of passengers increased from 1.46 billion to 3.8 billion (ICAO 2018). In Türkiye, 33.5 million passengers used air transport from 2002 to 2008, and this number was 193.3 million in 2017 alone. The number of aircrafts grew from 150 in 2002, 270 in 2008, 422 in 2013, and 645 in 2017 (DGCA 2017).

Despite the increasing number of studies on birds in Türkiye, there is still insufficient scientific monitoring or data on birds and flight safety. The Eastern Black Sea Region contains many different habitats for nearly 340 bird species that have been identified so far (Kahraman et al. 2016). Başkaya (1994) conducted a study on migratory bird species in the Eastern Black Sea Region, and Gülci (2011) investigated the effects of birds on flight safety at TIA.

The bird hazard ranking system is based on bird size and average weights, flocking characteristics, and flight behaviour. The morphological characteristics of birds should be known for effective control. This paper presents bird species occurring at TIA in Türkiye and their Aviation Safety Ranking Values (ASRV).
MATERIAL AND METHODS

During on-site direct information collection process, binoculars (10×42) and telescopes (20–60×) of various brands were used. To photograph the periodical status of the area and the species seen during the field observations, various models of digital and video cameras were used. To identify the species, body sizes, and average weights of the birds observed during the field study, we used reference works (Jonsson 2006, Heinzel et al. 1995, Kızıroğlu 2009). For species that were difficult to identify, we recorded the appearance, behaviours, and other helpful information (photograph, time of presence, etc.) in detail and then evaluated and clarified them. Areas in the airport with a high density of birds were identified, and 10 camera traps were installed to obtain photographs and video images of birds. For placing them in suitable areas, we used 10 specially prepared wooden sticks of 50 cm in length and 5 cm in thickness and used galvanised thin iron wires and pliers for fixing. We also used a small sickle to cut all kinds of grass, branches, and leaves at up to 10 meters from the cameras, which may have caused the devices to shoot continuously and hamper their battery life.

Study area

The phases of bird strikes are classified as take-off run, initial climb, climb, en-route, descent, maneouvre, initial approach, final approach, and landing (FAA, 2010). Accordingly, 48% of bird strikes occur during the climb, 30% during the approach, 15% during en-route flight, and 6% during descent (Maragakis 2009). Most bird strikes occur during the initial approach and climb phases (ICAO 2012; DGCA, 2016). As these phases take place near the airports, we carried out our field studies over a 3.5 km² area, including TIA and its surroundings, up to a 1 km radius. To create a land-use map of the airport and its

![Study area](https://via.placeholder.com/150)

**Fig. 1.** Study area (Google Earth, 2022)
surroundings for the areas that were extensively used by birds, we used Google Earth satellite images (Google Earth 2022) (Fig. 1). While detecting the bird species, we also made observations around the seaside parts in the northern part of the airport.

**Bird observations**

We conducted the study between February 2021 and February 2022 by direct observations and applying indirect data collection methods (camera traps, searching for and identifying bird nests, eggs, feathers, pellets in order to identify the bird species occurring in the study area). While making direct observations, the research teams were located at least 1 km away from each other, on towers within the airport, and in areas that would not endanger flight safety. During the study, we made at least 2 surveys each month. These observations were carried out at the airport periodically every season with a total of 75 observation periods. In this way, we found out which species visited the research area in which month and on which days. During the observations, we recorded the observation site, date, time, and migration status in detail. We used the following categories for the species: resident (R) for those observed throughout the year, wintering (W) for those observed during winter, summer visitor (SV) for those observed during summer, and passage migrant (PM) for those that did not incubate in the area but used the area for migration. After direct observations in the first two months (February–March), we placed 10 camera traps in these areas and recorded the species and group sizes of the birds. We planned the observations in coordination with the airport authorities and took the necessary measures not to endanger flight safety.

**Determining aviation safety ranking values**

The birds were evaluated in terms of body size, migration status, and weight based on the Aviation Safety Ranking Values (ASRV) accepted by the International Bird Strike Committee (IBSC 2002). The bird hazard ranking system is based on bird size (average weights), flocking characteristics, and flight behaviour. Obviously, large birds cause more damage than smaller birds. Weight is more important than overall size because the mass and density

| Severity of risk | Species characteristics       | Illustrative species                  |
|-----------------|-------------------------------|---------------------------------------|
| Level 1         | Small (50–300 gr), solitary   | Eastern meadowlark, swallows          |
|                 | Very small (<50 gr), solitary and flocking |                                   |
| Level 2         | Moderate (300–1000 gr), solitary | European starling                     |
|                 | Small (50–300 gr), flocking   |                                       |
| Level 3         | Large (1–1.8 kg), solitary    | Red-tailed hawk, American crow        |
|                 | Moderate (300–1000 gr), flocking |                                     |
| Level 4         | Very large (>1.8 kg), solitary | Vultures, mallards, great black-backed gulls |
|                 | Large (1–1.8 kg), flocking    |                                       |
| Level 5         | Very large (>1.8 kg), flocking | Geese, cranes, cormorants             |

ASRV: 1. without significant relevance for air traffic safety, 2. low potential danger, 3. intermediate potential danger, 4. high potential danger, 5. very high potential danger
of the bird determine actual damage (IBSC 2002). IBSC groups birds into five levels according to their potential hazards when they hit an aircraft (Table 1). In this table, birds are also evaluated based on weight and other conditions like being solitary or flocking. Hence, the results section includes separate threat classes according to the birds being solitary or flocking.

Also, according to the internationally accepted approach, the birds were classified based on their body size as small (S) (5-25 cm), medium (M) (25.1–39.9 cm), and large (L) (over 40 cm) (Morgenroth 2003).

RESULTS

In the study, we identified 109 bird species belonging to 39 families. Figure 2 describes the migration status of the observed birds. We established that a bird species might be categorised into more than one migration status, as some species can show different migratory behaviours.

There were 25 bird species weighing between 700 and 2200 grams in and around the airport. These were the red-throated loon, arctic loon, great crested grebe, great cormorant, European shag, pygmy cormorant, great egret, gray heron, white stork, Eurasian wigeon, northern pintail, red-crested pochard, common pochard, tufted duck, mallard, black kite, red kite, common buzzard, long-legged buzzard, booted eagle, peregrine falcon, common coot, lesser black-backed gull, yellow-legged gull, and raven. Among these species, there are 10 resident species weighing 700 grams or more. These are cormorant, European shag, great crested grebe, mallard, common buzzard, long-legged buzzard, common coot, lesser black-backed gull, yellow-legged gull, and raven. The carrion crow and the rock dove, weighing less than 700 grams, also heavily use the airport throughout the year, and among the migratory species under 700 grams that use the airport for temporary accommodation, little

![Fig. 2. Migration status of the detected bird species at Trabzon International Airport. Abbreviations: W = wintering, SV = summer visitor, R = resident, PM = passage migrant](image-url)
egret, common quail, Eurasian golden plover, northern lapwing, ruff, Eurasian woodcock, black-tailed godwit, common redshank, common greenshank, green sandpiper, common sandpiper, black-headed gull, mew gull, sandwich tern, and common tern. These species were found in groups of 20-60, and any of these flocks striking a moving aircraft would threaten flight safety.

According to the Aviation Safety Ranking Values (ASRV) classification, there were 36 bird species at TIA with threat levels of moderate (3), high (4), and very high (5) (Appendix). Also, according to the criteria set by the International Union for Conservation of Nature (IUCN 2022), 3 of the species identified here were endangered (Appendix). These were the common pochard, red-footed falcon, and European turtle dove. These three species were not resident to the study area and were among the migrating birds.

TIA has some very attractive areas for feeding and accommodation with its green areas, woodlands, sea cliffs, and runway lighting for birds. Besides, the open drainage canals and all other areas with temporary or permanent water cover in the airport also attract birds. Yellow-legged gulls, a great threat to flight safety both solitary and in flocks, were often seen in flight in the area. For accommodation, these birds prefer the roofs of buildings in and around the airport, the green areas with sparse but rather short grasses, mostly asphalt and concrete surfaces, and, individually, electric poles. As the grass grows in the area, the number of gulls in the green areas significantly decreases. In these areas, we observed no gulls during the periods when the grass was tall. Yellow-legged gulls fly in groups of 20-100 over the airport at low altitudes, particularly in cloudy weather. This low-altitude displacement poses a threat to aircraft take-offs and landings. We observed that during such times of cloudy weather, the yellow-legged gulls accommodate around the green areas covered with short grass or the asphalt and concrete floors in the airport when they are not flying.

Other resident bird species, mainly carrion crows and rock pigeons, were present in the green areas on the west side of the runway. Some resident species, like the carrion crows, were observed in the airport, on leafy tree species, in groups of 100. This low-altitude displacement poses a threat during aircraft take-offs and landings. In this area, rock doves used the roofs of buildings for accommodation. We observed that yellow-legged gulls and carrion crows often left some food materials (snails, fruit residues, etc.), waste materials (plastic bottles, caps, bags, etc.), branches, bushes, and leaves that they collected from the environment and the sea on the runway. These materials can pose a risk to flight safety. Besides, the electronic devices that are extremely important for flight safety at TIA, building roofs, power poles, wooden fences, lighting devices, plastic bollards, and antennas offer temporary roosting sites for both local and migratory bird species.

The camera traps were left on-site throughout the study period, and they photographed many bird species while landing or flying. 19 bird species in
the area were photographed and identified only by the camera traps. Also, we detected domestic cats (*Felis catus*) and golden jackals (*Canis aureus*), two mammal species, which may have a negative impact on flight safety. Of these species, the cat was observed at all day hours, and the golden jackal only appeared in the dark. The first image of the golden jackal was taken in April, after which we investigated where it entered the field and what paths it used. We concluded that the golden jackal entered the field using the garbage dump on the seaside of the airport. This issue and the necessity to take precautions were explained to the airport authorities. After May, we saw no image of the golden jackal until the end of the study.

**DISCUSSION**

The Eastern Black Sea Region contains various habitats for the nearly 340 bird species that have been identified so far (Kahraman et al. 2016). Although, we could not observe 38 of the 123 bird species identified by the direct observations of Gülçi (2011), who included the project area and the surrounding areas with a diameter of 13 kilometres. These species were the great white pelican (*Pelecanus onocrotalus*), Eurasian bittern (*Botaurus stellaris*), squacco heron (*Ardeola ralloides*), purple heron (*Ardea purpurea*), whooper swan (*Cygnus cygnus*), greater white-fronted goose (*Anser albifrons*), greylag goose (*Anser anser*), common shelduck (*Tadorna tadorna*), common teal (*Anas crecca*), garganey (*Spatula querquedula*), marbled teal (*Marmaronetta angustirostris*), smew (*Mergus albellus*), European honey-buzzard (*Pernis apivorus*), short-toed snake-eagle (*Circaetus gallicus*), Levant sparrowhawk (*Accipiter brevipes*), rough-legged buzzard (*Buteo lagopus*), saker falcon (*Falco cherrug*), Osprey (*Pandion haliaetus*), common moorhen (*Gallinula chloropus*), common crane (*Grus grus*), pied avocet (*Recurvirostra avosetta*), Pallas’s gull (*Larus ichthyaetus*), Mediterranean gull (*Larus melanocephalus*), great black-backed gull (*Larus marinus*), common barn owl (*Tyto alba*), short-eared owl (*Asio flammeus*), alpine swift (*Tachymarptis melba*), Eurasian wryneck (*Jynx torquilla*), woodlark (*Lullula arborea*), Eurasian crag martin (*Ptyonoprogne rupestris*), grey wagtail (*Motacilla cinerea*), mistle thrush (*Turdus viscivorus*), Sardinian warbler (*Curruca melanocephala*), red-breasted flycatcher (*Ficedula parva*), European pied flycatcher (*Ficedula hypoleuca*), Eurasian jackdaw (*Corvus monedula*), Eurasian siskin (*Spinus spinus*), and rock bunting (*Emberiza cia*). Also, 24 bird species that we detected in the area were not recorded by Gülçi (2011). These were the black-necked grebe, white stork, Eurasian wigeon, booted eagle, hen harrier, Montagu’s harrier, Eurasian sparrowhawk, Eurasian thick-knee, collared pratincole, kentish plover, Eurasian golden plover, mew gull, common tern, European turtle dove, laughing dove, European nightjar, crested lark, whinchat, olivaceous warbler, yellowhammer, black-headed bunting, corn bunting, great grey shrike, and lesser grey shrike.
An average passenger aircraft (Boeing 737NG, Airbus A320-200) takes off at a speed of 260–330 km/h (140–180 knots) and lands at a speed of 220–250 km/h (120–135 knots). For aircrafts with wider bodies, these numbers may be slightly higher. According to research data, bird strikes are mostly seen at 0–200 meters altitudes. Still, migratory birds flying at very high altitudes can also damage aircrafts. A 6-kg bird can have an impact equivalent to a force of 550 kg on an airplane travelling at 300 kilometres per hour, and a 1-kg bird has a force of approximately 100 kg. The relevant research found that pilot windows were damaged during a bird strike involving a 1.8 kg bird and an airplane travelling at 375 km/h (Hedenström 1993, Zhu et al. 2009, Walvekar et al. 2012). Other studies also indicate that every bird that weighs 700 gr or more is a threat to flight safety (Hedenström 1993, Zhu et al. 2009, Walvekar et al. 2012, Çoban & Bahar 2018). Even lighter birds can be a threat to flight safety when they are in a flock. We observed 24 bird species weighing 700 grams or more in our project in and around TIA.

CONCLUSION

Airports should appoint qualified personnel trained in the field to reduce the occurrences of bird strikes. For this purpose, wildlife-controlling units should be established. Bird observations should be made in all seasons. Grass control should be performed continuously during migration periods. Some studies state that thorny bushes and other difficult vegetation prevent birds from nesting and hiding at airports (Harrison et al. 1984, Desoky 2014). The soil characteristics at the airport should be considered, and airports should use thorny species that could be a food source for bird species and reduce the number of insects. Authorities should place inexpensive and easy-to-apply plastic asparagus wires, which should not adversely affect flight safety, on all structures that birds use during their temporary stay (electronic devices, building roofs on campus, power poles, wooden fences, lighting devices, plastic bollards, and antennas). We observed many coniferous and leafy tree species at TIA, which resident birds used for roosting and nesting. During the study, we detected solitary birds on the tops, branches, and interior parts of these coniferous trees. However, there were more than 100 groups of birds in leafy trees. Thus, before the vegetation period begins, airport authorities should contact the relevant public institution (General Directorate of Forestry, Trabzon Regional Directorate) to cut down all leafy trees against bird strikes. We observed that birds formed large groups around the open drainage canals in the airport and all areas that caused water accumulation. Thus, it is necessary to cover the open drainage canals inside the airport and to identify and level the depressions in the ground surface that cause water accumulation.
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## APPENDIX. Bird species detected at Trabzon International Airport and Aviation Safety Ranking Values (IBSC 2002)

| Euro code | English name          | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV |
|-----------|----------------------|----------------------|------|-----------------|-------------------------------|--------------|-------------|-------|
|           | Divers               |                      |      |                 |                               |              |             |       |
| 20        | Red-throated loon    | *Gavia stellata*     | LC   | W               | 61 / 106                      | L            | 1650        | 3     |
| 30        | Arctic loon          | *Gavia arctica*      | LC   | W               | 66 / 120                      | L            | 2200        | 5     |
|           | Grebes               |                      |      |                 |                               |              |             |       |
| 70        | Little grebe         | *Tachybaptus ruficollis* | LC | R, W             | 27 / 43                       | M            | 170         | 1     |
| 90        | Great crested grebe  | *Podiceps cristatus* | LC   | R, SV           | 49 / 88                       | L            | 730         | 2     |
| 120       | Black-necked grebe   | *Podiceps nigricollis* | LC | W               | 31 / 58                       | M            | 390         | 2     |
|           | Cormorants           | Phalacrocoracidae    |      |                 |                               |              |             |       |
| 720       | Great cormorant      | *Phalacrocorax carbo* | LC   | R, SV           | 90 / 145                      | L            | 3200        | 5     |
| 800       | European shag        | *Gelosia aristotels* | LC   | R               | 75 / 100                      | L            | 1800        | 4     |
| 820       | Pygmy cormorant      | *Microcarbo pygmaeus* | LC | W               | 48 / 85                       | L            | 700         | 2     |
|           | Herons, Egrets & Bitterns | Ardeidae             |      |                 |                               |              |             |       |
| 1190      | Little egret         | *Egretta garzetta*   | LC   | W, PM           | 60 / 90                       | L            | 450         | 2     |
| 1210      | Great white egret    | *Ardea alba*         | LC   | W, PM           | 95 / 155                      | L            | 1100        | 3     |
| 1220      | Grey heron           | *Ardea cinerea*      | LC   | W, PM           | 95 / 160                      | L            | 1500        | 3     |
|           | Storks               | Ciconiidae           |      |                 |                               |              |             |       |
| 1340      | White stork          | *Ciconia ciconia*    | LC   | SV              | 110 / 205                     | L            | 3400        | 5     |
|           | Ducks, geese & waterfowl | Anatidae             |      |                 |                               |              |             |       |
| 1790      | Eurasian wigeon      | *Mareca penelope*    | LC   | W               | 48 / 80                       | L            | 720         | 2     |
| 1860      | Mallard              | *Anas platyrhynchos* | LC   | R, W            | 56 / 90                       | L            | 1150        | 3     |
| 1890      | Northern pintail     | *Anas acuta*         | LC   | W               | 50 / 88                       | L            | 900         | 2     |
| 1960      | Red-crested pochard  | *Netta rufina*       | LC   | W               | 55 / 86                       | L            | 1150        | 3     |
| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 1980 | Common pochard   | *Aythya ferina*      | VU   | W                | 45 / 80                       | L            | 820         |      | 2   | 3  |
| 2030 | Tufted duck      | *Aythya fuligula*    | LC   | W                | 43 / 70                       | L            | 760         |      | 2   | 3  |

**Hawks**

| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 2380 | Black kite       | *Milvus migrans*     | LC   | PM               | 57 / 145                      | L            | 730         |      | 2   | 3  |
| 2390 | Red kite         | *Milvus milvus*      | LC   | PM               | 63 / 155                      | L            | 850         |      | 2   | 3  |
| 2600 | Western marsh-harrier | *Circus aeruginosus* | LC   | PM               | 52 / 120                      | L            | 650         |      | 2   | 3  |
| 2610 | Hen harrier      | *Circus cyanus*      | LC   | W, PM            | 48 / 110                      | L            | 430         |      | 2   | 3  |
| 2630 | Montagu’s harrier | *Circus pygargus*    | LC   | W, PM            | 48 / 105                      | L            | 320         |      | 2   | 3  |
| 2690 | Eurasian sparrowhawk | *Accipiter nisus*    | LC   | R, PM            | 33 / 68                       | M            | 220         |      | 1   | 2  |
| 2870 | Eurasian buzzard | *Buteo buteo*        | LC   | R, PM            | 54 / 120                      | L            | 900         |      | 2   | 3  |
| 2880 | Long-legged buzzard | *Buteo rufinus*     | LC   | R, PM            | 57 / 140                      | L            | 1150        |      | 3   | 4  |
| 2980 | Booted eagle     | *Hieraaetus pennatus*| LC   | PM               | 47 / 120                      | L            | 800         |      | 2   | 3  |

**Falcons & caracaras**

| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 3040 | Common kestrel   | *Falco tinnunculus*  | LC   | R, W             | 35 / 72                       | M            | 220         |      | 1   | 2  |
| 3070 | Red-footed falcon | *Falco vespertimus*  | VU   | PM               | 30 / 70                       | M            | 150         |      | 1   | 2  |
| 3100 | Eurasian hobby   | *Falco subbuteo*     | LC   | PM               | 32 / 77                       | M            | 230         |      | 1   | 2  |
| 3200 | Peregrine falcon | *Falco peregrinus*   | LC   | W, PM            | 44 / 105                      | L            | 700         |      | 2   | 3  |

**Fowls & pheasants**

| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 3700 | Common quail     | *Coturnix coturnix*  | LC   | PM               | 17 / 34                       | S            | 90          |      | 1   | 2  |

**Crakes, coots & gallinules**

| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 4290 | Common coot      | *Fulica atra*        | LC   | R, W             | 37 / 75                       | M            | 750         |      | 2   | 3  |

**Stilts & avocets**

| Euro | English name     | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|------|------------------|----------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 4550 | Black-winged stilt | *Himantopus himantopus* | LC   | W, PM            | 37 / 73                       | M            | 160         |      | 1   | 2  |
| Euro code | English name | Scientific name | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV |   |
|-----------|--------------|-----------------|------|------------------|--------------------------------|--------------|-------------|------|---|
| 4590      | Eurasian thick-knee | *Burhinus oedicnemus* | LC   | R, SV            | 42 / 80                        | L             | 460         | 2    | 3 |
| 4650      | Collared pratincole | *Glareola pratincola* | LC   | SV               | 26 / 63                        | M             | 85          | 1    | 2 |
| 4690      | Little Ringed plover | *Charadrius dubius* | LC   | SV               | 15 / 45                        | S             | 39          | 1    | 1 |
| 4770      | Kentish plover | *Charadrius alexandrinus* | LC   | R, W             | 16 / 50                        | S             | 42          | 1    | 1 |
| 4850      | Eurasian golden plover | *Pluvialis apricaria* | LC   | W                | 27 / 71                        | M             | 210         | 1    | 2 |
| 4930      | Northern lapwing | *Vanellus vanellus* | NT   | W                | 30 / 73                        | M             | 220         | 1    | 2 |
| 5170      | Ruff | *Calidris pugnax* | LC   | W, PM            | 28 / 54                        | M             | 160         | 1    | 2 |
| 5290      | Eurasian woodcock | *Scolopax rusticola* | LC   | W, PM            | 34 / 60                        | M             | 300         | 2    | 3 |
| 5320      | Black-tailed godwit | *Limosa limosa* | NT   | W, PM            | 40 / 66                        | L             | 290         | 1    | 2 |
| 5460      | Common redshank | *Tringa totanus* | LC   | W, PM            | 29 / 50                        | M             | 130         | 1    | 2 |
| 5480      | Common greenshank | *Tringa nebularia* | LC   | W, PM            | 32 / 57                        | L             | 190         | 1    | 2 |
| 5530      | Green sandpiper | *Tringa ochropus* | LC   | W, PM            | 22 / 43                        | S             | 71          | 1    | 2 |
| 5560      | Common sandpiper | *Actitis hypoleucos* | LC   | W, PM            | 20 / 34                        | S             | 40          | 1    | 1 |
| 5820      | Black-headed gull | *Larus ridibundus* | LC   | W                | 41 / 99                        | L             | 280         | 1    | 2 |
| 5900      | Mew gull | *Larus canus* | LC   | W                | 43 / 104                       | L             | 440         | 2    | 3 |
| 5910      | Lesser black-backed gull | *Larus fuscus* | LC   | W                | 60 / 138                       | L             | 770         | 2    | 3 |
| 5927      | Yellow-leggged gull | *Larus michahellis* | LC   | R                | 61 / 139                       | L             | 1100        | 3    | 4 |
| 6110      | Sandwich tern | *Thalasseus sandvicensis* | LC   | W                | 38 / 103                       | M             | 220         | 1    | 2 |
| Euro code | English name           | Scientific name      | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|-----------|------------------------|----------------------|------|-----------------|--------------------------------|--------------|-------------|------|-----|---|
| 6150      | Common tern            | Sterna hirundo       | LC   | PM              | 33 / 88                         | M            | 120         | 1    | 2   |   |
|           | Pigeons & doves        | Columbidae           |      |                 |                                 |              |             |      |     |   |
| 6650      | Rock dove              | Columba livia        | LC   | R               | 33 / 66                         | M            | 310         |      | 2   | 3 |
| 6680      | Stock dove             | Columba oenas        | LC   | W               | 33 / 66                         | M            | 300         |      | 2   | 3 |
| 6840      | Eurasian collared-dove | Streptopelia decaocto| LC  | R               | 32 / 51                         | M            | 150         |      | 1   | 2 |
| 6870      | European turtle-dove   | Streptopelia turtur  | VU   | SV              | 27 / 50                         | M            | 130         |      | 1   | 2 |
| 6900      | Laughing dove          | Spilopelia senegalensis| LC  | R               | 26 / 43                         | M            | 82          |      | 1   | 2 |
|           | Owls                   |                      |      |                 |                                 |              |             |      |     |   |
| 7570      | Little owl             | Athene noctua        | LC   | R               | 22 / 53                         | S            | 170         |      | 1   | 2 |
|           | Nightjars              | Caprimulgidae        |      |                 |                                 |              |             |      |     |   |
| 7780      | Eurasian nightjar      | Caprimulgus europaeus| LC  | R, SV           | 27 / 59                         | M            | 79          |      | 1   | 2 |
|           | Swifts                 | Apodidae             |      |                 |                                 |              |             |      |     |   |
| 7950      | Common swift           | Apus apus            | LC   | SV              | 16 / 45                         | S            | 38          |      | 1   | 1 |
|           | Kingfishers            | Alcedinidae          |      |                 |                                 |              |             |      |     |   |
| 8310      | Common kingfisher      | Alcedo atthis        | LC   | R               | 16 / 25                         | S            | 31          |      | 1   | 1 |
|           | Hoopoes                | Upupidae             |      |                 |                                 |              |             |      |     |   |
| 8460      | Common hoopoe          | Upupa epops          | LC   | SV              | 27 / 44                         | M            | 67          |      | 1   | 2 |
|           | Larks                  | Alaudidae            |      |                 |                                 |              |             |      |     |   |
| 9720      | Crested lark           | Galerida cristata    | LC   | R               | 17 / 34                         | S            | 43          |      | 1   | 1 |
|           | Swallows               | Hirundinidae         |      |                 |                                 |              |             |      |     |   |
| 9920      | Barn swallow           | Hirundo rustica      | LC   | SV              | 20 / 30                         | S            | 19          |      | 1   | 1 |
| 10010     | Northern house-martin  | Delichon urbicum     | LC   | SV              | 13 / 28                         | S            | 14          |      | 1   | 1 |
**AVIATION SAFETY RANKING VALUES AND BIRD SPECIES AT TRABZON AIRPORT**

| Euro code | English name       | Scientific name         | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV | St. | F |
|-----------|--------------------|-------------------------|------|------------------|-------------------------------|--------------|-------------|------|-----|----|
| 10040     | Tawny pipit        | *Anthus campestris*     | LC   | SV               | 16 / 26                       | S            | 28          | 1    | 1   |    |
| 10090     | Tree pipit         | *Anthus trivialis*      | LC   | PM               | 15 / 26                       | S            | 24          | 1    | 1   |    |
| 10110     | Meadow pipit       | *Anthus pratensis*      | LC   | W                | 14 / 24                       | S            | 19          | 1    | 1   |    |
| 10170     | Western yellow wagtail | *Motacilla flava*     | LC   | SV               | 17 / 25                       | S            | 18          | 1    | 1   |    |
| 10180     | Citrine wagtail    | *Motacilla citreola*    | LC   | SV               | 17 / 26                       | S            | 22          | 1    | 1   |    |
| 10200     | White wagtail      | *Motacilla alba*        | LC   | R                | 18 / 27                       | S            | 20          | 1    | 1   |    |
|           | Wrens              |                         |      |                  |                               |              |             |      |     |    |
| 10660     | Northern wren      | *Troglydytes troglodytes* | LC   | R, W             | 10 / 15                       | S            | 10          | 1    | 1   |    |
|           | Flycathers         |                         |      |                  |                               |              |             |      |     |    |
| 10990     | European robin     | *Erithacus rubecula*    | LC   | SV               | 13 / 21                       | S            | 17          | 1    | 1   |    |
| 11040     | Common nightingale | *Luscinia megarhynchos* | LC   | SV               | 16 / 24                       | S            | 21          | 1    | 1   |    |
| 11060     | Bluethroat         | *Cyanecula svecica*     | LC   | W                | 14 / 22                       | S            | 20          | 1    | 1   |    |
| 11210     | Black redstart     | *Phoenicurus ochruros*  | LC   | W                | 14 / 24                       | S            | 16          | 1    | 1   |    |
| 11220     | Common redstart    | *Phoenicurus phoenicurus* | LC   | W                | 14 / 22                       | S            | 15          | 1    | 1   |    |
| 11370     | Whinchat           | *Saxicola rubetra*      | LC   | R, SV            | 12 / 22                       | S            | 17          | 1    | 1   |    |
| 11390     | European stonechat | *Saxicola torquatus*    | LC   | SV               | 13 / 19                       | S            | 15          | 1    | 1   |    |
| 11440     | Isabelline wheatear| *Oenanthe isabellina*   | LC   | SV               | 16 / 29                       | S            | 31          | 1    | 1   |    |
| 11460     | Northern wheatear  | *Oenanthe oenanthe*     | LC   | SV               | 16 / 29                       | S            | 30          | 1    | 1   |    |
| 13350     | Spotted flycatcher | *Muscicapa striata*     | LC   | SV               | 14 / 24                       | S            | 17          | 1    | 1   |    |
| 13470     | Semi-collared flycatcher | *Ficedula semitorquata* | LC   | SV               | 13 / 23                       | S            | 14          | 1    | 1   |    |
| Euro code | English name                   | Scientific name       | IUCN   | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV St. | F |
|-----------|--------------------------------|-----------------------|--------|-----------------|-------------------------------|-------------|-------------|----------|---|
| 11870     | Eurasian blackbird             | Turdus merula         | LC     | R               | 24 / 36                       | S           | 100         | 1        | 2 |
| 12550     | Reed warblers & allies         | Acrocephalidae        |        |                 |                               |             |             |          |   |
| 13110     | Olivaceous warbler             | Iduna pallida         | LC     | SV              | 13 / 20                       | S           | 11          | 1        | 1 |
| 13140     | Leaf warblers                  | Phylloscopidae        |        |                 |                               |             |             |          |   |
| 13370     | Common chiffchaff              | Phylloscopus collybita| LC     | R, W            | 10 / 18                       | S           | 9           | 1        | 1 |
| 13360     | Kinglets                       | Regulidae             |        |                 |                               |             |             |          |   |
| 13430     | Goldcrest                      | Regulus regulus       | LC     | W               | 9 / 14                        | S           | 6           | 1        | 1 |
| 13440     | Long-tailed tits               | Aegithalidae          |        |                 |                               |             |             |          |   |
| 13470     | Long-tailed tit                | Aegithalos caudatus   | LC     | W               | 14 / 18                       | S           | 9           | 1        | 1 |
|           | Titis, chickadees & titmice    | Paridae               |        |                 |                               |             |             |          |   |
| 14610     | Coal tit                       | Periparus ater        | LC     | W               | 12 / 19                       | S           | 9           | 1        | 1 |
| 14620     | Eurasian blue tit              | Cyanistes caeruleus   | LC     | R, W            | 12 / 18                       | S           | 11          | 1        | 1 |
| 14640     | Great tit                      | Parus major           | LC     | R               | 14 / 24                       | S           | 18          | 1        | 1 |
|           | Shrikes                        | Laniidae              |        |                 |                               |             |             |          |   |
| 15150     | Red-backed shrike              | Lanius collurio       | LC     | SV              | 17 / 26                       | S           | 30          | 1        | 1 |
| 15190     | Lesser Grey shrike             | Lanius minor          | LC     | SV              | 20 / 28                       | S           | 45          | 1        | 1 |
| 15200     | Great Grey shrike              | Lanius excubitor      | LC     | SV              | 24 / 30                       | S           | 60          | 1        | 1 |
|           | Crows & jays                   | Corvidae              |        |                 |                               |             |             |          |   |
| 15390     | Eurasian jay                   | Garrulus glandarius   | LC     | R               | 34 / 55                       | M           | 170         | 1        | 2 |
| 15630     | Rook                           | Corvus frugilegus     | LC     | R               | 45 / 90                       | L           | 430         | 2        | 3 |
| 15670     | Carrion crow                   | Corvus corone         | LC     | R               | 46 / 98                       | L           | 510         | 2        | 3 |
| 15720     | Common raven                   | Corvus corax          | LC     | R               | 62 / 132                      | L           | 1300        | 3        | 4 |
| Euro code | English name       | Scientific name          | IUCN | Migration status | Body measurements Lt / WS (cm) | Size classes | Weight (gr) | ASRV St. | F |
|-----------|-------------------|--------------------------|------|------------------|-------------------------------|-------------|-------------|----------|---|
|           | Starlings         |                          |      |                  |                               |             |             |          |   |
| 15820     | Common starling   | *Sturnus vulgaris*       | LC   | SV               | 21 / 38                       | S           | 78          | 1        | 2 |
|           | Sparrows          |                          |      |                  |                               |             |             |          |   |
| 15910     | House sparrow     | *Passer domesticus*      | LC   | R                | 14 / 24                       | S           | 34          | 1        | 1 |
|           | Finches           |                          |      |                  |                               |             |             |          |   |
| 16360     | Common chaffinch  | *Fringilla coelebs*      | LC   | R                | 14 / 26                       | S           | 24          | 1        | 1 |
| 16490     | European greenfinch | *Chloris chloris*     | LC   | SV               | 15 / 26                       | S           | 28          | 1        | 1 |
| 16530     | European goldfinch | *Carduelis carduelis*   | LC   | SV               | 12 / 23                       | S           | 16          | 1        | 1 |
| 16660     | Red crossbill     | *Loxia curvirostra*      | LC   | W                | 20 / 28                       | S           | 47          | 1        | 1 |
| 17170     | Hawfinch          | *Coccothraustes coccothraustes* | LC | W | 18 / 31 | S | 58 | 1 | 1 |
|           | Buntings          |                          |      |                  |                               |             |             |          |   |
| 18570     | Yellowhammer      | *Emberiza citrinella*    | LC   | W                | 16 / 26                       | S           | 28          | 1        | 1 |
| 18660     | Ortolan bunting   | *Emberiza hortulana*     | LC   | SV               | 16 / 26                       | S           | 22          | 1        | 1 |
| 18820     | Corn bunting      | *Emberiza calandra*      | LC   | R, W             | 18 / 29                       | S           | 47          | 1        | 1 |

Abbreviations: IUCN = Global threat status, EN = endangered, VU = vulnerable, NT = near threatened, LC = least concern, DD = data deficient, NE = not evaluated. Migration status: R = resident, SV = summer visitor, PM = passage migrant, W = wintering. Body measures: Lt = length, WS = wingspan, S = small, M = medium, L = large, St = solitary, F = flocking. ASRV categories: 1 = without significant relevance for air traffic safety, 2 = low potential danger, 3 = intermediate potential danger, 4 = high potential danger, 5 = very high potential danger.
