



**7<sup>th</sup> MEETING OF THE AEWA STANDING COMMITTEE**  
26 – 27 November 2011, Bergen, Norway

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**DEFINING PERIODS OF BREEDING AND  
PRE-NUPTIAL MIGRATION FOR MIGRATORY  
AFRICAN-EURASIAN WATERBIRDS**

**Introduction**

Section 2.1.2 of the AEWA Action Plan states:

“2.1.2 Parties with populations listed in Table 1 shall regulate the taking of birds and eggs of all populations listed in column B of Table 1. The object of such legal measures shall be to maintain or contribute to the restoration of those populations to a favourable conservation status and to ensure, on the basis of the best available knowledge of population dynamics, that any taking or other use is sustainable. Such legal measures, subject to paragraph 2.1.3 below, shall in particular:

- (a) prohibit the taking of birds belonging to the populations concerned during their various stages of reproduction and rearing and during their return to their breeding grounds if the taking has an unfavourable impact on the conservation status of the population concerned; ... “

In Resolution 4.3, the Meeting of the Parties requested the Technical Committee, *inter alia*:

5. To review the periods during which huntable bird populations of conservation concern covered by the Agreement return to their breeding grounds and, if needed, to provide further guidance on the implementation of paragraph 2.1.2 (a) AEWA Action Plan.

**Previous relevant guidance**

Article 7(4) of the EU Directive on the conservation of wild birds contains similar provisions:

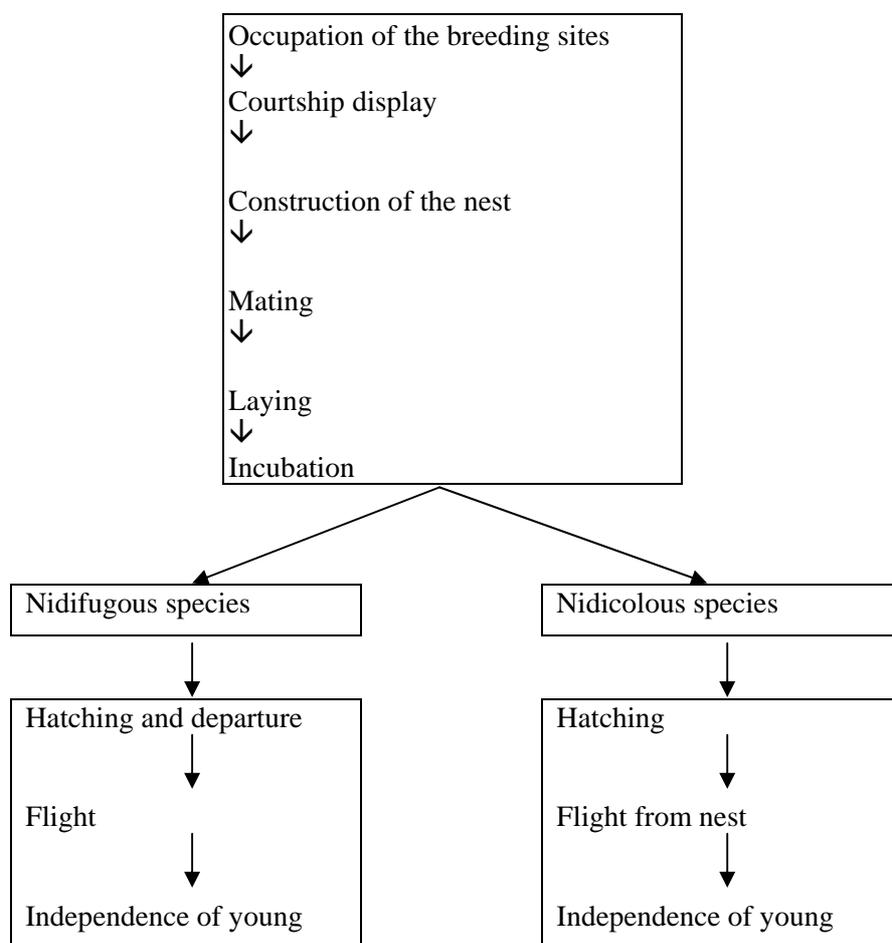
4. Member States shall ensure that the practice of hunting, including falconry if practised, as carried on in accordance with the national measures in force, complies with the principles of wise use and ecologically balanced control of the species of birds concerned and that this practice is compatible as regards the population of these species, in particular migratory species, with the measures resulting from Article 2. **They shall see in particular that the species to which hunting laws apply are not hunted during the rearing season nor during the various stages of reproduction. In the case of migratory species, they shall see in particular that the species to which hunting regulations apply are not hunted during their period of reproduction or during their return to their rearing grounds.** Member States shall send the Commission all relevant information on the practical application of their hunting regulations. [Emphasis added]

The European Commission, with the Member States have developed guidance on defining periods of breeding and pre-nuptial migration, initially for the EU15 and more recently for all 27 Member States (European Commission 2009). That analysis used the following definition:

## “Period of reproduction

‘**Breeding season**’<sup>1</sup> was defined using the definition of Cramp & Simmons (1977): “*the breeding season is the period during which a species lays and incubates its eggs and rears its young to the flying stage.*” However, the ‘**reproduction period**’ not only covers the breeding season but also includes the occupation of the breeding areas as recognised in the 1993 Commission report on the application of the Birds Directive<sup>2</sup>).

“The following scheme, which deals with the different stages of reproduction, was agreed as an appropriate general scheme for the period of reproduction. The sequence and importance of the elements of this general scheme may vary by species according to differences in breeding biology.”



## “Criteria used to identify the beginning and end of the period of reproduction

“In general, for migratory species, the stage of reproduction identifying the start of the period of reproduction is the 'occupation of the breeding sites'. However, the occupation of the breeding sites is generally difficult to use where the species is mainly locally resident or where there is a mixing of locally resident and migratory birds. In these cases, the stage identifying the start of the period of reproduction is the 'construction of the nest'. In those

<sup>1</sup> This term is considered equal and better English than the term 'rearing season' used in Article 7(4).

<sup>2</sup> COM (93) 572 final. *Second report on the application of Council Directive 79/409/EEC on the conservation of wild birds.* Brussels, 24 November 1993.

situations where the stage retained is difficult to recognise in the field, a mention is made to the corresponding number of decades counted from the start of egg laying (generally well known for most species).

- “In general, the stage retained to identify the end of the period of reproduction is the 'full flight of young birds', i.e. fledging of all broods including second or third broods for some species (e.g. rails / Rallidae, pigeons / Columbidae, thrushes / Turdidae). Full flight means that young birds are capable of sustained, continuous flight to a similar capacity as adult birds and corresponds to the 'independence of young birds'. Nonetheless, for certain species (e.g. crows / Corvidae) the full flight occurs before 'independence of young birds'. Young birds are independent when the loss of parental care and/or feeding does not significantly lower survival prospects of young. In those situations where the 'full flight/independence of young' is difficult to establish in the field, a mention is made to the corresponding number of decades counted from the end of hatching.”

## Migration

The EU adopted the following guidance with respect to determining the timing of migration (or 'return to the breeding areas'):

### “Return to the breeding areas”<sup>3</sup>

“Return to the breeding areas is an annual displacement, in one of more stages, of birds from their wintering areas back to nesting grounds. The wintering period ends with departure from the wintering areas where migrant birds have been more or less stationary since the end of the post-nuptial (autumn) migration. The return to the breeding areas is commonly called 'pre-nuptial migration' or 'spring migration'.

In Europe, return migration movements are mostly directed north, northeast or northwest. This means that migrants from African winter quarters first cross the Mediterranean, then pass through central Europe on their way to their Northern European breeding areas. This migration normally takes several weeks (including breaks at resting places on the way) but individual birds can complete the journey in one or a few days. The start, end and length of the migration season in a particular country are determined by a number of biological, geographical and methodological factors.

Regarding the beginning of the pre-nuptial migration, all individuals of a species within a same region do not end their wintering period at the same time. Not only are there individual differences, but within a single wintering area, birds of different populations having different annual cycles come together. Birds belonging to northern populations, for example, often start their return flight much later than birds breeding more to the south. An extreme case is the so-called 'leapfrog' migration (e.g. in the Redshank): birds breeding in more northern latitudes travel greater distances and move to more southerly wintering areas than those that nest farther south.

The fact that birds leave a wintering area does not necessarily mean that they start their return migration. They can move to other wintering quarters because of changes in the local ecological conditions, exhaustion of food resources, disturbance or changes in climatic conditions. When migratory and sedentary birds of the same species coexist on the same wintering grounds, the situation can be even more complex. Thus, apparent discrepancies may arise among the data for large countries. Major differences between neighbouring regions can

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<sup>3</sup> "return to breeding areas" is taken as a synonym of "return to the rearing grounds"

reflect ecological differences more than actual differences in migration timing. For example, although the southern parts of Spain (Andalucía) and Italy (Sicilia) are situated on the same latitude (37th) this does not necessarily imply similar arrival dates of migrants because different populations might be involved.

The length of the migration period does not only depend on the north-south extension of the country concerned but also on the availability and the use of resting places. A typical example concerns the Bar-tailed Godwits, which migrate from the Banc d'Arguin in Western Africa, they stay several weeks in the Wadden Sea. The migration period length is also determined by the quantity and the geographical range of the birds involved: a small population can pass in a few days while a numerous species with an extensive breeding range can have a prolonged migratory season encompassing several months. Moreover, the migration period can also be extended if a country is passed over by several populations with different time schedules.

Methodological reasons can also account for a short period: the start and end dates of migration are not recorded accurately because it only involves small numbers of birds which are often not noted if few observations are available (low chance of recording). As said before, availability of data differs very much from species to species (behavioural differences) and from country to country (e.g. numbers of observers).

In general, the beginning of the return migration can only be estimated by comparison of data from many different regions of the European Union, analysis of ring recoveries and consideration of arrival dates in the breeding areas.

Information defining the timing of pre-nuptial migration was based on statistics relating to populations rather than individual birds.”

**“Presentation of data** [on migration and breeding periods]

“To avoid spurious precision and to allow for normal between-year variation in timing of migration and breeding events, the data presentations summarise the data on reproduction and return migration in ‘decades’ or ten-day periods (i.e. 1-10, 11-20, 21 up to 31 in each month).

“A number of general principles were adopted in the gathering of data:

- Where there is a range in timing of pre-nuptial migration or breeding (as will occur in most countries of significant size), the data used relate to the earliest periods in each of the Member States concerned. This is generally relating to the southernmost parts or lowest altitudes. Likewise, for the end of the reproduction, the data used refers to the latest dates. This means that regional differences may exist for prenuptial migration and reproduction periods within the territory of one Member State, which may be relevant. ...
- Where significant between-year variation occurs on a regular basis, data from the earliest periods have always been taken;
- Where different populations of the same species migrate through a country at different times, information relating to the earliest migrating population has been used. In some cases, where different populations (i.e. different subspecies or different flyways) are clearly distinguishable in the field, their correspondent timings where given.

- Extreme, outlying and erratic data have been excluded due to their unpredictable nature and falling outside normal patterns of variation between and within years.”

## **Beyond Europe**

In Africa, the definition of breeding seasons and migration periods become increasingly complex as the reproductive cycles of birds relate to different forms of seasonality and environmental predictability. These issues are explored in detail by Dodman & Diagona (2006) who highlighted that, in Africa, there are a range of definitional and other complexities that make the concept of simple latitudinal migration patterns of northern or temperate Eurasia difficult to apply. Such issues include multiple migratory behavioural types, such as:

- Local movers/short distance migrants;
- Rains migrants/ arid zone migrants;
- Nutrition migrants/post-roost dispersers;
- Post-breeding dispersers;
- Nomads;
- Altitudinal migrants; and
- Environmental response migrants.

Further, Dodman & Diagona (2006) stressed that whilst migration in northern climates is strongly determined by seasonal patterns, in tropical regions there are multiple different triggers for waterbird movements, including:

- Sudden availability of productive wetlands;
- Rising water levels/flooding;
- Falling water levels/edge effects; and
- Lack of rain/increasing aridity.

Dodman & Diagona (2006) further highlighted a range of practical problems in relation to defining intra-African migration:

- Many African flyways are diffuse, and not easy to specify.
- Some sites are only important irregularly, e.g. once every few years, especially temporary wetlands.
- Site networks are not always obvious, and may include large numbers of small wetlands or sites that are not used regularly.
- Several species exploit wetlands at different periods and for different reasons, such that sites cannot be maintained in a constant state; rather it is important to permit natural flooding and other cycles.
- Many waterbirds are nomadic and are not faithful to specific routes or annual seasons.
- It is difficult to monitor intra-African migrants: current procedures under the AfWC focused on coordinated biannual censuses are not effective enough in identifying migratory strategies.
- On a practical level, there are low resources and capacity for conserving intra-African migrants, whilst other issues also influence monitoring, such as inaccessibility and security.

They concluded that “the high diversity of “movement strategies” of African waterbirds and the often limited ability to predict movements render their management and conservation quite difficult. The life cycles and movements of most African waterbirds are not precisely known, and the networks of key sites not well determined.”

## **Recommendations related to section 2 of AEWA's Action Plan**

The Technical Committee recommends that for the purposes of the implementation of the obligations of section 2 of the AEWA Action Plan, one of the following options are pursued as appropriate:

1. The Member States of the European Union should continue to use the definitions (above and Table 1) established previously by European Commission (2009), incorporating any future amendments in these should they be agreed by the EU.
2. Other non-EU European countries, which typically are relatively 'data-rich' with respect to ornithological information, should adopt the EU definitions following review to ensure their applicability in the countries concerned.
3. Non-European countries (Africa, Middle East and western Eurasia) should establish definitions appropriate to the country concerned based on knowledge of species' breeding biology in the appropriate regions. These should be used to determine the timing of the start and end of the breeding period. The following guidance may assist this process:
  - a. Review published knowledge of individual species breeding biology. Particularly valuable sources of information are given in Table 2.
  - b. Review any published knowledge, if this exists, of breeding biology in the country concerned.
  - c. Especially in the absence of published knowledge, consider what is known about the timing of breeding in neighbouring countries, or within the region, bearing in mind their position (north or south) of the country concerned and the implication that may have with respect to climatic/seasonal timing.

## **General recommendations related to intra-African migrants**

As noted previously, intra-African migrants provide a range of problems related to the implementation of section 2 (and other parts) of AEWA's Action Plan. The Technical Committee highlights the recommendations previously made by Dodman & Diagona (2006). These remain highly relevant to advancing conservation of such species:"

1. "Improve knowledge of the status of African waterbirds and their migratory patterns through:
  - Applied research of weather patterns, site conditions and waterbird seasonality;
  - Extending the African Waterbird Census (AfWC) to other seasons and other areas;
  - Use/analysis of existing AfWC and other data to identify site linkages and migratory patterns;
  - Increased adoption of satellite telemetry;
  - Initial conservation focus on a series of "high profile species";
  - Monitoring, research and conservation of threatened species;
  - Development of AFRING (African bird ringing scheme).
2. Identify key sites and site networks for intra-African migrants, especially threatened species.
3. Develop Species Action Plans for African waterbirds.
4. Promote increased focus on intra-African migrants in the implementation of the AEWA.

5. Adopt a precautionary principle; it is often necessary to implement conservation action before knowing the full picture.
6. Enhance awareness of African waterbirds, especially their values and ecological roles.
7. Highlight the plight and lack of knowledge of threatened African waterbirds.
8. Mobilize resources for conservation and monitoring of intra-African migrants, especially through development and subsequent implementation of a Conservation Strategy for African Waterbirds.”

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Table 1. Definitions for the start end of breeding periods as defined by the EU (European Commission 2009). Only species listed by AEWA are listed here.

Species	Start of breeding period	End of breeding period
<i>ANATIDAE</i>		
<i>Cygnus olor</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Anser fabalis</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Anser anser</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Anas penelope</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Anas strepera</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Anas crecca</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Anas platyrhynchos</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Anas acuta</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Anas querquedula</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Anas clypeata</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Netta rufina</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Aythya ferina</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Aythya fuligula</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Aythya marila</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Somateria mollissima</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds

Species	Start of breeding period	End of breeding period
	where it is mainly migratory <ul style="list-style-type: none"> <li>• construction of the nest in all other cases</li> </ul>	
<i>Clangula hyemalis</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Melanitta nigra</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Melanitta fusca</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Bucephala clangula</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Mergus serrator</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Mergus merganser</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<b>RALLIDAE</b>		
<i>Rallus aquaticus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds (3 decades <sup>4</sup> after hatching)
<i>Gallinula chloropus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds (5 decades after hatching)
<i>Fulica atra</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds (6 decades after hatching)
<b>HAEMATOPODIDAE</b>		
<i>Haematopus ostralegus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<b>CHARADRIIDAE</b>		
<i>Pluvialis apricaria</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Vanellus vanellus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<b>SCOLOPACIDAE</b>		
<i>Philomachus pugnax</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds

<sup>4</sup> i.e. periods of ten days

<b>Species</b>	<b>Start of breeding period</b>	<b>End of breeding period</b>
<i>Lymnocyptes minimus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds (c. 4 decades after hatching)
<i>Gallinago gallinago</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites with courtship display</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds (c. 4 decades after hatching)
<i>Scolopax rusticola</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites (roding)</li> </ul>	full flight of young birds (c. 4 decades after hatching )
<i>Limosa limosa</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Limosa lapponica</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Numenius phaeopus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Numenius arquata</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Tringa erythropus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<i>Tringa totanus</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites where it is mainly migratory</li> <li>• construction of the nest in all other cases</li> </ul>	full flight of young birds
<i>Tringa nebularia</i>	<ul style="list-style-type: none"> <li>• occupation of the breeding sites</li> </ul>	full flight of young birds
<b>LARIDAE</b>		
<i>Larus ridibundus</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (2 decades before egg laying)</li> </ul>	full flight of young birds
<i>Larus canus</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (2 decades before egg laying)</li> </ul>	full flight of young birds
<i>Larus fuscus</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (3 decades before egg laying)</li> </ul>	full flight of young birds
<i>Larus argentatus</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (3 decades before egg laying)</li> </ul>	full flight of young birds
<i>Larus cachinnans</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (3 decades before egg laying)</li> </ul>	full flight of young birds
<i>Larus marinus</i>	<ul style="list-style-type: none"> <li>• courtship display at breeding sites (3 decades before egg laying)</li> </ul>	full flight of young birds

Table 2. Valuable sources of information useful to determining the start and end of breeding seasons, and the timing of migration, of African and Eurasian waterbirds.

<b>Waterbird family</b>	<b>Information on breeding seasons</b>	<b>Information on migration periods</b>
<b><i>Sphenisciformes</i></b> <i>Spheniscidae</i> Penguins	Africa: Brown <i>et al.</i> (1982); Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)	Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)
<b><i>Gaviiformes</i></b> <i>Gaviidae</i> Divers	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)
<b><i>Podicipediformes</i></b> <i>Podicipedidae</i> Grebes	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)
<b><i>Pelacaniiformes</i></b> <i>Phaethontidae</i> Tropicbirds <i>Pelecanidae</i> Pelicans <i>Sulidae</i> Gannets and boobies <i>Phalacrocoracidae</i> Cormorants <i>Fregatidae</i> Frigatebirds	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)
<b><i>Ciconiiformes</i></b> <i>Ardeidae</i> Herons and Egrets <i>Ciconiidae</i> Storks <i>Balaenicipitidae</i> Shoebill <i>Threskiornithidae</i> Ibises	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992); Kushlan & Hancock (2005)	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992); Kushlan & Hancock (2005)
<b><i>Phoenicopteriformes</i></b> <i>Phoenicopteridae</i> Flamingos	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ; Hockey <i>et al.</i> (2005) All regions: del Hoyo <i>et al.</i> (1992)
<b><i>Anseriformes</i></b> <i>Anatidae</i> Ducks, geese and swans	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ;	Western Palearctic: Cramp & Simons (1977) Africa: Brown <i>et al.</i> (1982) ;

Waterbird family	Information on breeding seasons	Information on migration periods
	<p>Hockey <i>et al.</i> (2005); Viljoen (2005)</p> <p>All regions: Bauer &amp; Glutz von Blotzheim (1963); del Hoyo <i>et al.</i> (1992); Scott &amp; Rose (1996); Kear (2005)</p>	<p>Hockey <i>et al.</i> (2005); Viljoen (2005)</p> <p>All regions: del Hoyo <i>et al.</i> (1992); Scott &amp; Rose (1996); Kear (2005)</p>
<p><b><i>Gruiformes</i></b></p> <p><i>Gruidae</i> Cranes</p> <p><i>Rallidae</i> Rails, flufftails, crakes, gallinules, moorhens and coots</p>	<p>Western Palearctic: Cramp &amp; Simons (1980)</p> <p>Africa: Urban <i>et al.</i> (1986) ; Hockey <i>et al.</i> (2005) ; Viljoen (2005)</p> <p>All regions: del Hoyo <i>et al.</i> (1996)</p> <p>Rallidae: Taylor (1998)</p>	<p>Western Palearctic: Cramp &amp; Simons (1980)</p> <p>Africa: Urban <i>et al.</i> (1986) ; Hockey <i>et al.</i> (2005) ; Viljoen (2005)</p> <p>All regions: del Hoyo <i>et al.</i> (1996)</p> <p>Rallidae: Taylor (1998)</p>
<p><b><i>Charadriiformes</i></b></p> <p><i>Dromadidae</i> Crab Plover</p> <p><i>Haematopodidae</i> Oystercatchers</p> <p><i>Recurvirostridae</i> Stilts and avocets</p> <p><i>Burhinidae</i> Thick-knees</p> <p><i>Glareolidae</i> Practincoles</p> <p><i>Charadriidae</i> Plovers</p> <p><i>Scolopacidae</i> Snipes, curlews and sandpipers</p> <p><i>Stercorariidae</i> Skuas</p> <p><i>Laridae</i> Gulls</p> <p><i>Sternidae</i> Terns</p> <p><i>Rynchopidae</i> Skimmers</p> <p>Alcidae Auks</p>	<p>Western Palearctic: Cramp &amp; Simmons (1983); Cramp (1985)</p> <p>Africa: Urban <i>et al.</i> (1986) ; Hockey <i>et al.</i> (2005)</p> <p>All regions: del Hoyo <i>et al.</i> (1996)</p>	<p>Western Palearctic: Cramp &amp; Simmons (1983); Cramp (1985)</p> <p>Africa: Urban <i>et al.</i> (1986) ; Hockey <i>et al.</i> (2005)</p> <p>All regions: del Hoyo <i>et al.</i> (1996)</p> <p>All regions for waders: Delany <i>et al.</i> (2009)</p>