

Flamingos presumably escaped from captivity find suitable habitat in Western Europe

door Joop Treep, oktober 1998.

Deze tekst werd gepubliceerd op de webpagina "Flamingo's in Nederland" www.flamingosinnederland.info.

Dit is de ingekorte tekst van de mondelinge bijdrage door Joop Treep op de Wetlands International/IUCN-SSC Flamingo Specialists Group Meeting, die van 24 tot 26 oktober 1998 werd gehouden in Miami, Florida, USA. De tekst werd gepubliceerd in 2000 in **Waterbirds** Volume 23 (Special Publication 1): 32-37. De Leon Springs, FL.: The Waterbird Society.

© Op de gehele inhoud van deze tekst berust het copyright bij de auteur.

Abstract

Some 25 years ago a group of Chilean Flamingos (*Phoenicopterus chilensis*) appeared in the coastal waters of The Netherlands, Germany and Denmark. In subsequent years the group was enlarged by some Greater Flamingos (*P. ruber roseus*) and Caribbean Flamingos (*P. r. ruber*) and also appeared in inland waters. This free-living flamingo group became very adaptive to these habitats. I reviewed literature on flamingo presence in Western Europe, habitats and weather conditions in these areas, as well as summarized my own observations. The flamingos established an inland breeding colony and winter in the joint delta of the rivers Rhine, Meuse and Scheldt. They developed a clear annual migratory pattern. Although salt and brackish waters are available, the flamingos prefer fresh water. Young flamingos are born almost annually, but it seems that numbers can only be kept stable (about 50) by the occasional addition of escapes.

Key words

Caribbean Flamingos, Chilean Flamingos, exotics, Greater Flamingos, hybridization, migration, winter, *Phoenicopterus chilensis*, *Phoenicopterus ruber roseus*, *Phoenicopterus ruber ruber*.

Introduction

The presence of flamingos in Europe is well known from the countries around the Mediterranean: France, Spain, Portugal, and Italy. The native species in this area is the Greater Flamingo (*Phoenicopterus ruber roseus*), but it is less known that flamingos also can be seen in the more northern parts of the continent: the coastal and inland waters of The Netherlands, Germany, and Denmark (VAN DEN BERG 1987). Most of these flamingos are Chilean (*P. chilensis*), but they occur in a mixed group with some Greater and Caribbean Flamingos (*P. r. ruber*).

These flamingos initially did not attract the attention of biologists, because they were considered escaped birds, which usually soon disappear. However, it became clear that these flamingos had not disappeared; on the contrary, their numbers were growing. My first knowledge of flamingo presence in Dutch waters was a short report in a newspaper in 1980 that some flamingos had been observed in the Wadden Sea near the Isle of Schiermonnikoog. The phenomenon intrigued me that birds not previously known to the region were obviously able to find a suitable habitat in Western Europe. In 1989, I decided to find out where these birds had come from, in what areas they lived, and what circumstances (food supply, weather conditions, etc.) could explain their continued presence

Methods

I searched the indexes of many local bird periodicals (Het Vogeljaar, Vogels, Limosa, Dutch Birding, Sterna, Vanellus) for references on flamingo presence since 1965, studied local bird inventories (Vogels van Drenthe, Vogels in Friesland, Avifauna van Groningen, Atlas van de Nederlandse Vogels), and studied databases, reports, and other publications by governmental and nongovernmental organizations (SOVON,

RIKZ, RIZA, Staatsbosbeheer, KNMI). Additionally, I solicited observers and biologists in The Netherlands, Germany, Belgium, and Denmark for any information on flamingo sightings in Western Europe. These efforts resulted in a collection of hundreds of flamingo observations over the past 30 years. Some observations were very detailed, others less. I visited areas where flamingos were reported and made multiple observations, most by spotting scope.

One of the areas I visited very regularly was the Zwillbrocker Venn, a nature reserve on the German-Dutch border where the flamingos established a breeding colony. I also participated in a study of the flamingo behavior in the Venn (1994), and the ringing of the young birds (1993-96).

To obtain general information on flamingos, I read some 100 publications (publications in scientific journals, books, theses, publications in zoo journals), of which the following were very important for my study: GALLET (1949), ALLEN (1956), JENKIN (1957), ROTH (1962), STUDER-THIERSCH (1974), KEAR & DUPLAIX-HALL (1975), JOHNSON (1979, 1980-1998), VERHOEVEN (1980), CÉZILLY ET AL (1992), and the references mentioned in the text.

Results and discussion

I combined all the observation data. The number of free-living flamingos remained fairly constant since the winter of 1978-79 (total 45) and is now (1998) estimated at 40 Chilean, 10 Greater, 1 or 2 Caribbean, and 2 or 3 Lesser Flamingos (*Phoeniconaias minor*). However, flamingos observed at different places and times were very likely the same birds, which could be derived from the composition (numbers per taxon) of the groups and the presence of birds that could individually be recognized within the groups because they had been ringed in the Zwillbrocker Venn. There

also was a constant process of splitting into smaller groups, reassemblance, and splitting again. The 3 *Phoenicopter* taxa formed mixed groups that sometimes contained subtaxa groups within the larger group. Pair bonds and copulation acts were regularly observed.

These free-living flamingos developed a clear annual migratory pattern. During winter, most birds move to the joint delta of the rivers Scheldt, Rhine, and Meuse (The Delta) in the southwest of The Netherlands. In spring, most birds migrate to the breeding colony in the Zwillbrocker Venn in Germany. Breeding birds and nonbreeding birds reassemble in autumn on the Steile Bank, a sandbank in Lake IJssel (The Netherlands), from where they depart to wintering areas in November. There is no evidence or indication that exchanges with other flamingo populations occur (e.g., France).

The main habitats visited by flamingos are freshwater areas. During severe winters, the flamingos use salt-water areas. However, the climate at the wintering area is very mild whereby a total freeze is exceptional.

Numbers

Although flamingo bones have been found in an estimated 4,000-6,000-year-old Neolithic settlement in The Netherlands, there is no evidence that flamingos regularly occurred in northwest Europe during the last 2,000 years. My review of the local periodicals on birds revealed that flamingos were seldom seen in the northwestern part of Europe during the first half of the 20th century. A single flamingo was occasionally reported from British, Belgian, Dutch, or German waters, but until the end of the 1950s these birds were always considered to be Greater Flamingos. It was presumed these birds had strayed from native habitats in southern Europe or even Kazakhstan.

In 1958, a flamingo observed on the Isle of Vlieland was identified as a Chilean Flamingo, presumably escaped from a zoo or another bird collection. From 1958 to 1973, this species was identified at least 10 times at various places in Germany and The Netherlands (all single birds). In 1971, however, a total of 14 (a group of 13 + 1 single) flamingos was observed in the Wester Scheldt (The Delta). Obviously, a whole group of these birds had escaped or had been released (TREP 1994). In the years between 1971 and 1978, there were several observations of flamingo groups in Dutch coastal waters, mainly in the northern part of the country. In Lake Lauwers, groups of 13 flamingos were observed in 1975, 16 in 1976, 16 in 1977, and 19 in 1978, but many observers unfortunately only reported the description 'flamingos'. However, most reported flamingos were presumably Chilean Flamingos because their numbers were slowly increasing: there were positive identifications of 5 Chilean Flamingos in 1975, 5 in 1976, and 12 in 1978. During winter 1978-79, the number of flamingos wintering in The Delta suddenly increased to 45 birds (presumably all Chilean Flamingos), and another 6 were found

dead.

In the early 1980s, some Chilean Flamingos established a breeding colony on an islet in the Zwillbrocker Venn (RUEMLER 1985), a shallow water area that remained after peat cutting in the past. In the beginning, only a few birds took part in breeding, but the number of flamingos coming to the breeding area increased annually, from a single flamingo in 1980 to 6 in 1982 (P. KE•LER, Johannes Gutenberg-Universität Mainz, Germany, unpublished data), to at least 40 in 1996. Between 1983 and 1990, only 2-5 young were born annually and about half of them survived until fledging. However, because observers feared that the young 'tropical' birds would not survive the winter, most of them were captured and taken to zoos. From 1991 to 1995, the number of young born in the Zwillbrocker Venn increased to between 4 and 10 (a few were Greater Flamingos), but breeding attempts failed from 1996 to 1998.

Despite the low growth rate, mortality of adult birds, collisions with high-tension cables, traffic, and barbed wire, etc., the number of Chilean Flamingos remained stable at about 40 birds. Hence, it seems likely that some individuals from elsewhere must have joined the group, because there are many private birdkeepers with flamingos in their collections, as well as the numerous zoo populations. About 25% of the free-living flamingos at the present time have been born in the Zwillbrocker breeding colony.

From 1985, an increase in the number of Greater Flamingos in Western Europe also occurred. From an occasional bird or so, the number grew to at least 13 in 1993. It is unknown where these individuals originated from, but it is quite possible that some or maybe all of them were of wild origin. Perhaps the presence of the closely related Chilean Flamingos attracted wandering single Greater Flamingos to remain in the area and to join the group. Although the number has slightly decreased since 1993, it is almost certain that these Greater Flamingos winter together with the Chilean Flamingos in The Delta, among which are 2 juveniles born and ringed in the Zwillbrocker Venn. Since about 1990, some Caribbean Flamingos also have become members of this population. The 1-5 Lesser Flamingos that are seen occasionally do not join the other flamingos, and I will not discuss their occurrence further because numbers are low and their presence is irregular.

Mixed Groups

Remarkably, Chilean, Greater, and Caribbean Flamingos easily formed mixed living groups, although they are closely related species (SANGSTER 1997). In 1986, the first Greater Flamingo already accompanied the Chilean Flamingos to the breeding site, and the first Caribbean Flamingo visited the Zwillbrocker Venn in 1994. The Chilean Flamingos probably accidentally discovered the suitability of the inland location for establishing a breeding colony. Most likely Greater and Caribbean Flamingos were also attracted to this

site because of the presence of the Chilean Flamingos. Although the 3 *Phoenicopterus* forms usually segregate by species during breeding, mixed groups have been observed displaying, and several mixed pairs have been observed copulating, building nests, breeding, and raising chicks (GRIESOHN-PFLIEGER

1995a,b). Of course there is no positive proof that mixed pairs raising a chick are actually the biological parents. In fact, I observed several incidents of mate infidelity in flamingos whereby an individual relieved from the nest was observed copulating soon afterwards with birds other than its own mate.

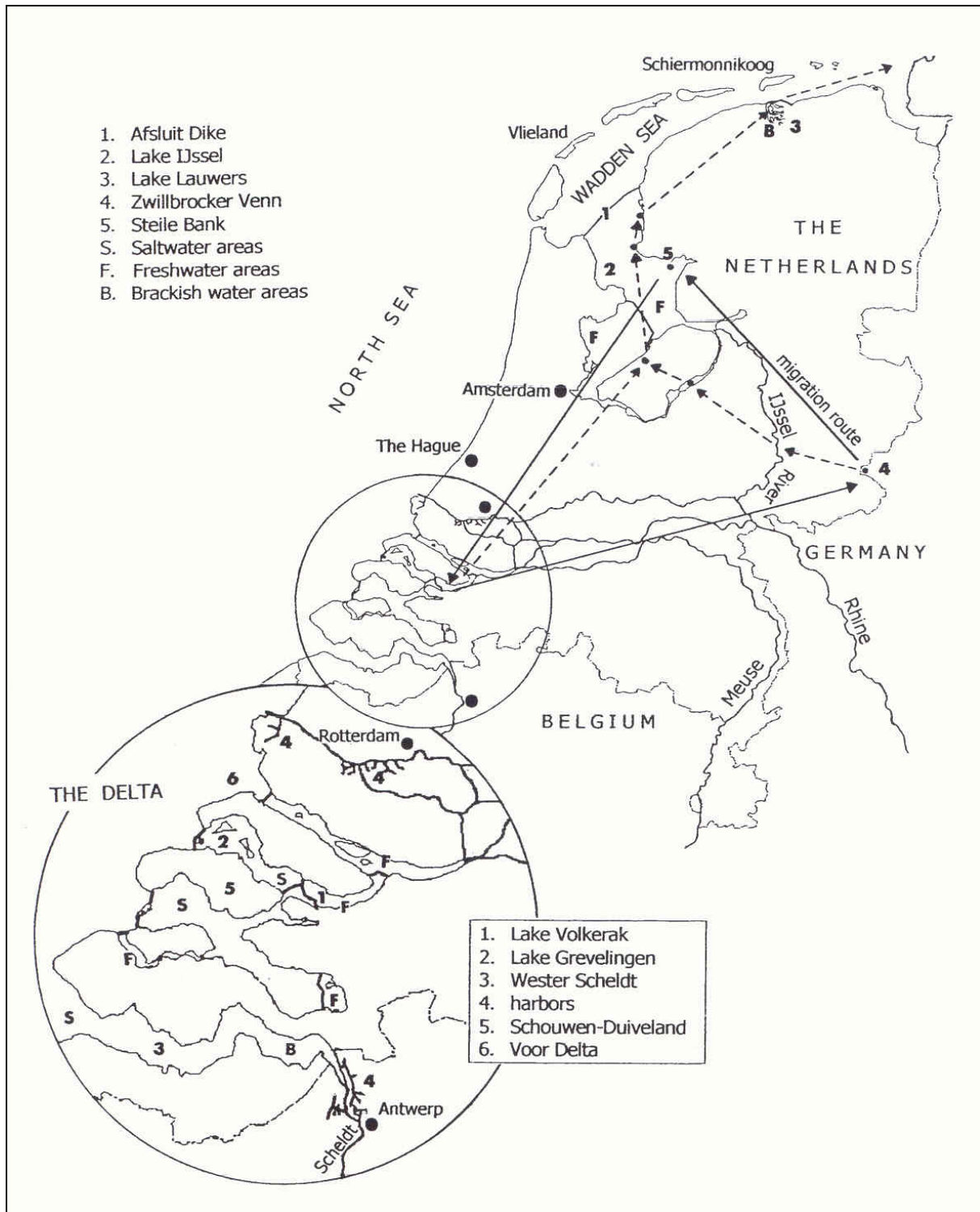


Figure 1. Habitats and migration route of free-living flamingos in Western Europe

Migratory Pattern

Prior to 1978, the flamingos in northwestern Europe were highly mobile within their new habitat (Fig. 1). They were often seen on the coasts of Lake IJssel and in Lake Lauwers, and they wandered along the coast of the Wadden Sea to Germany, Denmark, and even Sweden (CHRISTENSEN 1992). Lake Lauwers was especially used by the flamingos, even in winter. During cold winters, however, this area often freezes; hence, flamingos soon realized The Delta was influenced by the warm Gulf Stream and thus was a more suitable wintering site; wintering flamingos have occurred here since 1979.

From 1979 to 1997, the mean temperature in this area during the 3 coldest months, December through February, was 4.4°C, which is a normal value for this area during the 20th century, according to the data of the Dutch Meteorological Office (KNMI). The lowest temperature recorded in this period was -12.1°C, and the number of days the temperature remained below zero averaged 12.2/winter. Comparison of these weather conditions during winter in The Delta with those in the Camargue, the main wintering area for flamingos in southern Europe (JOHNSON ET AL 1991), accents the mildness of the climate in The Delta, which is situated about 1,000 km farther north (TREP 1996).

Shelter from stormy weather is found by the flamingos on Schouwen-Duiveland Island, in shallow water areas behind the dikes that remained after dike-bursts in the past. Their favorite winter habitat is the shallow Lake Volkerak. This freshwater lake easily freezes during frosts, and the flamingos then fly westwards to the saltwater Lake Grevelingen, which seldom freezes. When Lake Grevelingen does freeze, however, flamingos find open water in the Voor Delta, an area of sandbanks and lagoons in the North Sea, formed after the city of Rotterdam extended its harbors into the sea.

From February to April, depending on weather conditions, the flamingos leave the wintering area in small groups and fly in a northeastern direction. Some flamingos head directly for the breeding site in the Zwillbrocker Venn, some 200 km away, while others first visit preferred areas in Lake IJssel and Lake Lauwers. Some flamingos do not go to the breeding area at all, but stay in The Delta, in Lake Lauwers, or even fly along the coast to Germany and Denmark. During the breeding season, when food conditions near the breeding site seem to become insufficient, small groups of birds make feeding flights to the borders of the IJssel River and Lake IJssel.

Nonbreeding and unsuccessful birds start to leave the Venn in July. From July until October, the Steile Bank in Lake IJssel serves as a staging area. Successful breeders and fledged young also occur there. In the past 3 years, the flamingos did not successfully breed in the Zwillbrocker Venn. In June, all birds have left the Venn. The group splits-up, and small groups are

reported from a wide area in northern Germany and The Netherlands. In September, however, the group at the Steile Bank begins to increase, and in November all flamingos leave and fly to The Delta.

Habitat

About half of the Dutch territory is below sea level. Over 1,000 years ago the Dutch started to protect their land against the sea and gained land from the sea by building dikes. In the 20th century, modern techniques have made it possible to construct better dikes. Thus, the coastline was straightened by the building of some huge dams. The first and most important operation was the building of the Afsluit Dike from 1928 to 1932, which created Lake IJssel where the water level could be regulated with the help of discharge sluices. Further important dams were built in the north, creating Lake Lauwers, and in the southwest between the islands in The Delta (Fig. 1).

A substantial initial problem was that polluted water and sediments transported by the rivers accumulated in the water basins behind the dams. In the last 20 years, however, water pollution in Western Europe has effectively been attacked. Wastewaters from factories were reduced considerably, and all domestic sewage is now treated to remove phosphates, nitrates, heavy metals, organic compounds, and other pollutants before discharge.

Bird life especially took advantage of the shallow waters created by these water projects. Habitat quality has improved with water quality, and vast areas have been given protected status in the last 50 years. Flamingos also found suitable habitats in these areas, and they have selected the best places where they are not disturbed and can find sufficient food.

Although salt and brackish waters are available, the flamingos prefer the freshwater areas in Western Europe. Flamingos apparently have no special preference for saltwater. The presence of sufficient food appears to be the main consideration in choice of either salt or freshwater (HURLBERT ET AL 1986, BILDSTEIN ET AL 1993). The water quality in Lake Volkerak, with an abundance of widgeongrass (*Ruppia maritima*), copepods, and insect larvae (BALDÉ ET AL 1993) seems to explain why flamingos moved from the saltwater Lake Grevelingen, which was preferred as a wintering area in the 1980s, to the freshwater Lake Volkerak in the 1990s.

The longstanding presence of a breeding colony of some 10,000 Black-headed Gulls (*Larus ridibundus*) causes a severe eutrophication of the Zwillbrocker Venn (SCHWÖPPE 1987). The nutrient richness seems to bring about the large numbers of crustacea and corixide larvae in the water (P. KEBLER, unpublished data). This richness also might explain why the flamingos chose this freshwater area for establishing a breeding colony, although freshwater breeding colonies are rare (KIRWAN 1992).

Literature cited

- ALLEN, R.P. (1956), **The flamingos: their life history and survival**. National Audubon Society Research Report 5.
- BALDÉ, P., BELJERSBERGER, J. & DE KRAKER, K., editors. (1993), Themanummer Krammer-Volkerak. *Sterna* 38: 57-136. (In Dutch).
- BILDSTEIN, K. L., GOLDEN, C.B., MCCRAITH, C.J., BOHMKE, B.W. & SEIBELS, R.E. (1993), Feeding behavior, aggression and the conservation biology of flamingos: integrating studies of captive and free-ranging birds. *American Zoology* 33: 117-125.
- CÉZILLY, F. & JOHNSON, A.R. (1992), Exotic flamingos in the western Mediterranean region: a case for concern? *Colonial Waterbirds* 15: 261-263.
- CHRISTENSEN, R. (1992), Flamingoernes forekomst i Danmark. *Dansk Ornitologisk Forening* 86: 123-127. (In Danish with English summary).
- GALLET, E. (1949), **The flamingos of the Camargue**. Blackwell, Oxford, UK.
- GRIESOHN-PFLIEGER, T. (1995a), Flamingos brüten in Deutschland! *Der Falke* 42: 205-209. (In German).
- GRIESOHN-PFLIEGER, T. (1995b), Neues aus Zwillbrock: Jetzt brüten auch Karibische Flamingos! *Der Falke* 42: 278-279. (In German).
- HURLBERT, S. H., LOAYZA, W. & MORENO, T. (1986), Fish-flamingo-plankton interactions in the Peruvian Andes. *Limnology and Oceanography* 31: 457-468.
- JENKIN, P. M. (1957), On the filter-feeding and food of flamingos (*Phoenicopteri*). *Transactions of the Royal Society of London Series B* 240: 401-493.
- JOHNSON, A. R. (1979), Greater Flamingo (*Phoenicopterus ruber roseus*) ringing in the Camargue and an analysis of recoveries. *The Ring* 100: 53-58.
- JOHNSON, A. R., coordinator (1980, 1984, 1986, 1988, 1989, 1992, 1995, 1998), Flamingo Specialist Group Newsletters 1-9.
- JOHNSON, A. R., GREEN, R.E. & HIRONS, G.J.M. (1991), Survival rates of Greater Flamingos in the west Mediterranean region. In: PERRINS, C. M., LEBRETON, J-D., & HIRONS, G.J.M., editors, **Bird population studies, relevance to conservation and management**: 249-271. Oxford University Press, Oxford, UK.
- KEAR, J. & DUPLAIX-HALL, N., editors (1975), **Flamingos**. T. & A.D. Poyser, Berkhamstead, UK.
- KIRWAN, G. (1992), A freshwater breeding record of Greater Flamingo *Phoenicopterus ruber* in Turkey. *Sandgrouse* 14: 56-57.
- ROOTH, J. (1962), **The flamingos on Bonaire (Netherlands Antilles): Habitat, diet and reproduction of *Phoenicopterus ruber ruber***. The Natural Science Study Group for Suriname and the Dutch Antilles, Publication 41.
- RUEMPLER, G. (1985), Freilebende Flamingos brüten in der Bundesrepublik. *Geflügel-Börse* 106: 14. (In German).
- SANGSTER, G. (1997), Species limits in flamingos, with comments on lack of consensus in taxonomy. *Dutch Birding* 19: 193-198.
- SCHWÖPPE, M. (1987), Massensammlung von Lachmöwen im Zwillbrocker Venn und ihre Folgen für das Naturschutzgebiet. In: **Unsere Heimat** - Jahrbuch des Kreises Borken 1987: 65-72. (In German).
- STUDER-THIERSCH, A. (1974), Die Balz der Flamingogattung *Phoenicopterus*, unter besonderer Berücksichtigung von *Ph. ruber roseus*. *Zeitschrift für Tierpsychologie (Ethology)* 36: 212-266. (In German with English summary).
- TREEP, J.M. (1994), Zijn flamingo's *Phoenicopterae* blijven rtjes in Nederlandse wateren? *Het Vogeljaar* 42: 208-217. (In Dutch with English summary).
- TREEP, J.M. (1996), Koude winter deert flamingo's niet. *Het Vogeljaar* 44: 199-201. (In Dutch).
- VAN DEN BERG, A., B. (1987), Voorkomen, herkenning en status van flamingo's in Nederland. *Dutch Birding* 9: 2-7. (In Dutch with English summary).
- VERHOEVEN, J.T.A. (1980), **The ecology of *Ruppia*-dominated communities in Western Europe**. Catholic University of Nijmegen, The Netherlands.