Recent status and changes in abundance of Taiga Bean Geese wintering in NE Jutland

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(Med et dansk resumé: Bestandsstatus og ændringer i forekomsten af overvintrende Tajgasædgæs i Nordøstjylland)

Abstract The first ever coordinated counts of wintering Taiga Bean Geese *Anser f. fabalis* at their three main wintering sites in NE Jutland showed that peak numbers increased from 1065 in winter 2004-2005 to 2300 in winter 2016-2017, an average annual increase of 5.3%. Elevated numbers in January 2012 and January/February 2016 suggest an influx from another wintering resort, but comparisons with counts of the wintering group in Viskadalen, Västra Götaland in Sweden (150-200 km to the NE) suggest this area was only the potential source of the extra birds in one out of four years. Based on intensive regular counts, the main wintering site, Lille Vildmose, has supported the entire flock at some point in the winter in each season since 2010, with the possible exception of 2016-2017. Whereas the other two important sites, Tjele Langsø and Nørreådalen, are now more often used only in mid-winter, potentially as hard-weather refuges, they were formerly used by some geese throughout the winter. The results confirm the increasing significance of Lille Vildmose for this sub-population and the importance of combining information from individually marked birds with systematic coordinated counts to effectively monitor this population of conservation concern.

Introduction

Two sub-species of Bean Geese, distinguished in the field by head and bill shape (Burgers *et al.* 1991), winter regularly in western Europe, including Denmark. The western Palearctic Tundra Bean Goose *Anser f. rossicus* numbers over 600 000 individuals and the population is increasing (Fox *et al.* 2010, Fox & Madsen 2017, T. Heinicke *in litt.*). It breeds on the Russian tundra from the Kola Peninsula in the west to the Taimyr Peninsula in the east (Scott & Rose 1996, van den Bergh 1999). In recent years *rossicus* has started to breed in tundra and forest tundra regions in northern Scandinavia and even in southern Norway (Aarvak & Øien 2009, Heinicke 2010, de Jong *et al.* 2013). The western Taiga Bean Goose *Anser f. fabalis* (hereafter TBG) numbered an estimated 100 000 birds in the mid-1990s, but had decreased to 63 000 by 2009 and further to 52 600 by 2015 (based on mid-winter counts presented in Marjakangas *et al.* 2015). The TBG breeds discontinuously in the boreal forest and adjacent open mire and tundra from Fennoscandia to western Siberia and winters in north-west Europe and Central Asia (Madsen *et al.* 1999, Marjakangas *et al.* 2015). Because of recent declines in the abundance of TBG and contractions in wintering range, the status of this population

has been the focus of considerable conservation attention in very recent years. This effort culminated in the drafting of an African Eurasian Waterbird Agreement International Single Species Action Plan (AEWA ISSAP) for effective conservation of TBG (Marjakangas *et al.* 2015). Recent studies suggest subdivision of this population into four major units; for full details see Marjakangas *et al.* (2015):

(i) A Western Flyway population that breeds in central Scandinavia and winters in the UK and NW Jutland
(ii) A Central Flyway population breeding in northern Sweden, Norway, Finland and adjacent parts of Russia wintering in southern Sweden and SE Denmark, but including a small group that winters in NE Jutland (see below)
(iii) An Eastern I Flyway population that breeds in western Siberia and winters in eastern Germany and western Poland
(iv) An Eastern II Flyway population that also breeds in Western Siberia that winters in central Asia (SE Kazakhstan, eastern Kyrgyzstan and NW China)

Spring counts of the Central Flyway TBG migrating through south-central Sweden during the period 2007-2017 point to a recovery from a minimum of 43 000 TBG in 2011 to 60 000 in 2017 (Skyllberg 2015 and U.S. unpublished data). In addition, more TBG from this flyway (potentially as many as 10 000 birds) migrate east of the Baltic Sea (T. Heinicke *pers. comm.*) and therefore do not feature in these spring counts, yet add more birds to the total size of the central TBG flyway population. Up to 75 500 Bean Geese were counted in southern Sweden in October 2016, including a minimum of over 8000 Tundra Bean Geese, but also over 24 000 not assigned to subspecies (L. Nilsson *in litt.*). For this reason, it seems that the true total is very likely higher than mid-winter counts suggest.

Although past lack of racial differentiation hinders a thorough historical understanding of the two subspecies, Denmark has been (and continues to be) an important overwintering area for TBG, and has previously supported up to 30 000 birds during 1985-1996 (Madsen *et al.* 1999). However, in recent years numbers have probably been less than 10 000, primarily distributed between many regularly used sites on Zealand, Lolland and Falster and the remainder at five major sites in northern Jutland. Recent telemetry studies and neck-collar marking of birds at Lille Vildmose (LVM) in North Jutland (56°54'N, 10°13'E; see Fig. 1 for locations) show that these birds are largely confined to this site. They do, however, move to foraging areas in Nørreådalen (NÅD, 56°27'N, 9°41'E) and in the vicinity of Tjele Langsø (TLS, 56°32'N, 9°39'E) during periods of hard winter weather, when some individuals may also continue to traditionally used areas in the Netherlands and other irregularly used sites elsewhere in Jutland (O.R. Therkildsen & A.D. Fox unpubl.). Telemetry studies and sightings of marked TBG from Lille Vildmose have also revealed discrete migration routes to breeding areas in northern Scandinavia and to moulting areas on Novaya Zemlya, Russia. The important conclusion from the initial telemetry results, however, is that the groups of geese that occur during the course of a single winter at LVM, NÅD and TLS are largely one and the same discrete flock, although there is evidence of between-winter exchange of a few marked individuals with flocks wintering in NW Jutland, SE Denmark, Scania (in southern Sweden) and eastern Germany (authors' unpublished data). For this reason, it is important to effectively monitor the annual size of this discrete wintering flock to gauge its conservation status and change over time. Mid-winter January counts may not adequately describe the maximum numbers, which may occur later in winter as geese move out of staging/wintering sites in Sweden and elsewhere in response to severe weather. Furthermore, since the distribution of geese between the three main areas in NE Jutland shifts during winter, especially depending upon temperature, snow cover, levels of disturbance and extent of flooding between the different sites, it is important to coordinate count efforts to derive reliable annual maximum numbers based on simultaneous counts at the three areas.

Fig. 1. Map showing locations of Lille Vildmose (LVM), Tjele Langsø (TLS) and Nørreådalen (NÅD).
Kort, der viser placeringen af Lille Vildmose (LVM), Tjele Langsø (TLS) og Nørreådalen (NÅD).

For this reason and as a contribution to the future monitoring of this population within the context of the AEWA ISSAP, we here present and analyse the results of coordinated counts carried out regularly at LVM, NÅD and TLS during the winters of 2004-2005 to 2016-2017. The counts provide annual totals for the NE Jutland TBG flock, changes in site use over that period and trends in overall numbers.

We thank the many landowners for granting us access to their properties to find and count geese, as well as the referees and editors for improvements on an earlier version. Finally, we thank Nick Quist for improving our English.

Methods

Study areas

Lille Vildmose (LVM) was probably historically one of western Europe's largest lowland raised bog systems. During the last century extensive drainage schemes were implemented to create new land for agriculture and to facilitate peat cutting. In recent years, following substantial peat removal, cutting has gradually ceased in most of the area which has subsequently either been subject to a raised bog restoration project, reverted to wetland or left as permanent grassland. The creation of large, open, cattle grazed fields of permanent grassland within the current EU Special Protection Area and Ramsar site since the late 1990s has provided increased areas of suitable feeding habitat for TBG, which also exploit agricultural land adjacent to LVM. At night, TBG formerly roosted either on Tofte Mose (on adjacent undamaged areas of raised bog) or on lake Tofte Sø, but now do so on flooded former peat extraction pits or on the coast when these begin to freeze. LVM itself is easily monitored from an extensive network of public roads, whereas some of the adjacent agricultural land may be more inaccessible and difficult to survey.

Tjele Langsø (TLS) and Nørreådalen (NÅD) is an area of mixed farmland with pastures and winter cereals as dominant crop types. NÅD is a heavily drained river valley with willow scrub, reed beds and wet grazed meadows. In winter, the meadows become flooded, providing attractive feeding conditions for TBG. During night, TBG roost either on Tjele Langsø, in flooded areas along the Nørreå or on the Nørreå itself. The farmland around TLS is not easily monitored from public roads, making the area extremely difficult to cover systematically without a good knowledge of the places used by geese. In contrast, the mosaic of meadows along the Nørreå is more easily monitored, but good vantage points are widely separated, making simultaneous counting difficult, particularly if the geese are disturbed.

Both TLS and LVM have been designated as NATURA 2000 sites to protect the wintering TBG, which means that the statutory authorities have an obligation to maintain the population in a favourable conservation status. NÅD is also designated as a NATURA 2000 site, but provides no special protection for TBG.

Counts

Counts were carried out using the "look-see" method of Bibby *et al.* (2000), based on prior knowledge of the habitat preferences of TBG wintering in the three areas. Although this may inevitably result in the gradual discovery of more birds as their habits and site-use become better known, the authors had been surveying the subspecies for several years before the time series presented here and therefore we remain confident that these counts are representative of the overall numbers present for these years. At LVM, this involved coverage of all the fields south of Hegnsvej, east of Kystvej and west of Ny Høstemarkvej, as well as the fields south of Møllesøvej to the remaining area of raised mire and Tofte Sø to the south. For TLS, this involved coverage of all likely feeding areas within 5 km of Tjele Langsø and for NÅD included the valley flood plain from Tapdrup to Skjern Kirke.

It has been suggested that the conspicuous peaks in maximum TBG numbers in January 2012 (2020) and February 2016 (2306; see Figs. 2 and 4) compared to other within-winter counts are explained by an influx of TBG from elsewhere. Some 700-1000 TBG regularly winter in Viskadalen, Västra Götaland, western Sweden, 150-200 km NE of LVM. The geese feed on agricultural land along the river Viskan north to Viskanäs, NE of the village of Horred and roost at Veselången, a broadening of the river about 10 km to the south. Collar readings indicate some exchange of individuals between the wintering flocks at Viskadalen and LVM. For this reason, we also present summarised counts from Viskadalen retrieved from the Swedish internet site for bird observations (Artportalen 2017). These have been organized into maximum daily counts reported at least for 10-day periods for the relevant times of winter, for 15-day periods (December and March), or monthly periods (April).

Winter temperature

To assess the effects of temperature on the abundance and movements of TBG in NE Jutland, we compiled mean monthly January temperatures for Aalborg (57°6'N, 9°52'E, 3 m above sea level) and Göteborg Landvetter (56°54'N, 10°13'E, 169 m above sea level) from Tutiempo (2017a and 2017b, respectively).

Tab. 1. Monthly maximum numbers of Taiga Bean Geese in the areas of Tjele Langsø and Nørreådalen.
Månedlige maksimumforekomster af Tajgasædgæs ved Tjele Langsø og i Nørreådalen.

Year	Jan	Feb	Mar	Apr	Sep	Oct	Nov	Dec
2005	35	480	735				150	650
2006	1100	635	1190				0	147
2007	950	800	499			7	171	52
2008	440	295	0				96	38
2009	685	1280	0			3	0	1045
2010	350	160	550				830	895
2011	850	1400	1350				0	75
2012	1434	1500	21				0	1020
2013	1500	1475	22				0	49
2014	1400	1500	30				10	500
2015	225	715	0				0	0
2016	1800	0	0				0	35
2017	800	1200	0					

Tab. 2. Monthly maximum numbers of Taiga Bean Geese counted at Lille Vildmose.
Månedlige maksimumforekomster af Tajgasædgæs i Lille Vildmose.

Year	Jan	Feb	Mar	Apr	Sep	Oct	Nov	Dec
2005	946	700	340				170	320
2006	800	425	205			8	480	641
2007	990	1050	350			7	754	800
2008	940	1021	17			9	800	910
2009	955	775	400			19	315	1196
2010	182	0	700	9	1	80	655	2
2011	948	1400	932			50	560	700
2012	2020	1432	518	1		265	550	1324
2013	1178	1412	1305			130	1003	1386
2014	1410	1515	624			45	725	1028
2015	1470	1600	580			42	900	1675
2016	1645	2306	740			200	1300	1750
2017	1750	1720	580					

Results

Maximum TBG winter counts from NÅD/TLS combined and LVM are shown in Tab. 1 and 2, respectively. Full details of these counts can be found in the annual reports of Brandt (2007-2016). Based on coordination of counts from both sites, the combined best simultaneous count data from each winter were used to compile a series of maximum winter counts shown in Fig. 2. This suggests a rate of increase of 5.3% per year (based on the slope from the fitted regression model of natural log transformed maximum count *lnMax* and year *Y*, using the formula $lnMax = -99.35 + 0.053Y$, $F_{1,12} = 30.6$, $P = 0.0002$).

TBG tend to arrive at LVM in larger numbers in October and November before moving on to NÅD and TLS (Fig. 3). In most years, the entire flock moves from LVM to NÅD/TLS, where maximum numbers tend to occur in January/February, but in some winters (notably 2007-2008 and 2014-2015), less than half of the maximum numbers recorded at LVM ever appeared at NÅD/TLS. Lower numbers tend to occur at NÅD/TLS in winters when January temperatures are above 3°C (Fig. 4). However, only one out of four years when temperatures fell below a mean of -3°C in Sweden did there appear to be an additional arrival of TBG to NE Jutland sites which may have be associated with departures from potential Swedish staging areas to the north and east (Fig. 4). Since 2011, the maximum count of TBG in NE Jutland has derived almost entirely from LVM, whereas

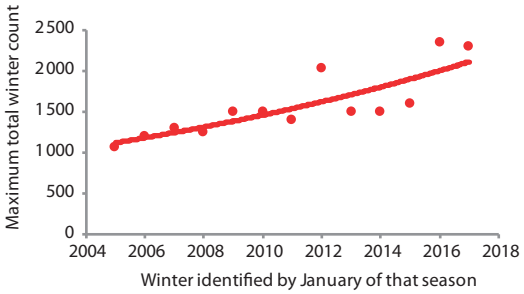

Fig. 2. Maximum numbers of the NE Jutland Taiga Bean Goose wintering population based on coordinated counts in Lille Vildmose, Nørreådalen, and sites in the vicinity of Tjele Langsø, 2004-2005 to 2016-2017.
Maksimumforekomster af Tajgasædgæs overvintrende i Nordøstjylland baseret på koordinerede optællinger i Lille Vildmose, Nørreådalen og lokaliteter omkring Tjele Langsø i vintrene fra 2004-05 til 2016-17. Bemærk, at hver vinter er angivet som januar i det pågældende år.

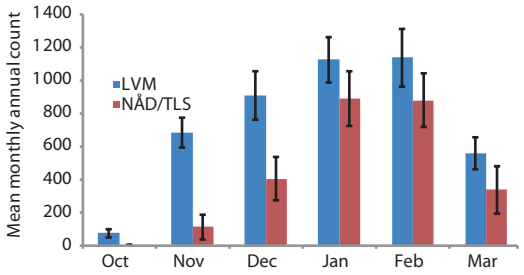

Fig. 3. Mean winter numbers (± standard errors) of Taiga Bean Geese in Lille Vildmose (LVM) and Nørreådalen and sites in the vicinity of Tjele Langsø combined (NÅD/TLS), based on data from 2004-2005 to 2016-2017 inclusive.
Gennemsnitlige vinterforekomster (± standardafvigelser) af Tajgasædgæs i Lille Vildmose (LVM) samt i Nørreådalen (NÅD) og på lokaliteter omkring Tjele Langsø (TLS) opgjort samlet (NÅD/TLS) baseret på data fra 2004-05 til 2016-17 inklusive.

prior to 2011, the maximum count at LVM fell well below the winter annual maximum number from coordinated counts throughout all the sites (except in 2017, see Fig. 5).

Despite apparent regular movements of TBG away from Viskadalen during recent winters, Tab. 3 fails to provide unequivocal evidence for a departure from this part of Sweden as an explanation for the maximum counts of over 2000 birds in NE Jutland in January 2012 and February 2016. On 10 January 2012, 2020 TBG were counted at LVM, but there was no clear sign of a departure from Viskadalen based on numbers present on 3 and 13 January 2012 (Tab. 3). On 15 January 2016, 1250 TBG were counted at TLS and 1100 at LVM, where 2306 were later

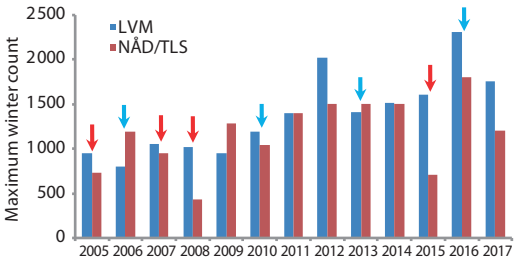

Fig. 4. Maximum winter numbers of Taiga Bean Geese from Lille Vildmose (LVM), and combined numbers from Nørreådalen and sites in the vicinity of Tjele Langsø (NÅD/TLS) from 2004-2005 to 2016-2017. Note that each winter is identified as January of the year concerned in each case. Red arrows identify winters with mean Aalborg January temperatures in excess of 3°C when proportionally fewer geese of the winter total were encountered at NÅD/TLS. Blue arrows identify winters with mean Göteborg January temperatures below -3°C, which do not seem to correspond to years with additional influxes of geese potentially arriving from Sweden, except in 2016.
Maksimum vinterforekomster af Tajgasædgæs i Lille Vildmose (LVM) og samlede antal fra Nørreådalen og lokaliteter omkring Tjele Langsø (NÅD/TLS) fra 2004-2005 til 2016-2017. Bemærk, at hver vinter er angivet som januar i det pågældende år. Røde pile angiver vintre, hvor middeltemperaturen i januar i Aalborg var højere end 3°C og, hvor en mindre andel af den samlede vinterbestand af gæs blev observeret i NÅD/TLS. Blå pile angiver vintre, hvor middeltemperaturen i januar i Göteborg var mindre end -3°C, hvilket tilsyneladende ikke falder sammen med år, hvor der kunne være tale om et øget tiltræk af gæs fra Sverige, dog bortset fra vinteren 2016.

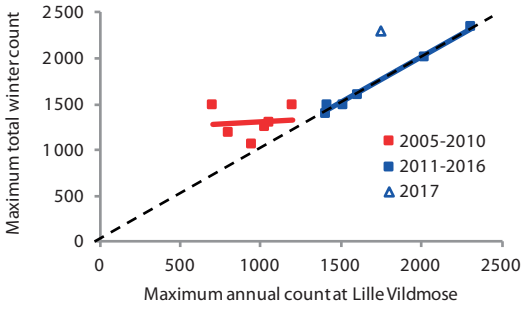

Fig. 5. Relationship between the maximum winter numbers of Taiga Bean Geese compiled from coordinated counts in Lille Vildmose, Nørreådalen and sites in the vicinity of Tjele Langsø and the maximum winter numbers from Lille Vildmose. The dotted line indicates a 1:1 ratio which fits the years since 2010, with the exception of 2016-2017.
Forholdet mellem maksimum vinterforekomster af Tajgasædgæs opgjort ved hjælp af koordinerede tællinger i Lille Vildmose, Nørreådalen samt lokaliteter omkring Tjele Langsø og maksimum vinterforekomster i Lille Vildmose. Den stiplede linje angiver, at forholdet er 1:1, hvilket har været tilfældet siden 2010, dog bortset fra 2016-2017.

Tab. 3. Maximum numbers of Bean Goose per month (April), 15- day (December and March) and 10-day-periods (January and February) in Viskadalen, Västra Götaland, western Sweden, based on unsystematic counts entered by local ornithologists on Artsportalen (2017). Where no values are present this indicates that there are no entered counts for the period. Black cells indicate periods with a major influx to Lille Vildmose/Nørreådalen. Grey cells indicate periods where much lower numbers than normal peak counts were entered.

Maksimumforekomster af Sædgæs pr. måned (april), i 15-dages perioder (december og marts) og 10-dages perioder (januar og februar) i Viskadalen, Västra Götaland, vestlige Sverige, baseret på usystematiske optællinger udført af lokale ornitologer og indrapporteret til Artsportalen (2017). Tomme felter angiver, at der ikke er indrapporteret optællinger for den pågældende periode. Sorte felter angiver perioder med et større tiltræk til Lille Vildmose/Nørreådalen. Grå felter angiver perioder, hvor der blev indrapporteret markant lavere antal end normalt.

	Dec 1-15	Dec 16-31	Jan 1-10	Jan 11-20	Jan 21-31	Feb 1-10	Feb 11-20	Feb 21-29	Mar 1-15	Mar 16-31	Apr
2015/16	100 (14 Dec)	15 (31 Dec)	700 (3 Jan)	700 (15 Jan)	16 (26 Jan)	500 (5 Feb)	295 (19 Feb)				
2014/15	350 (14 Dec)	500 (27 Dec)	500 (3 Jan)	500 (11 Jan)	500 (22 Jan)	700 (8 Feb)	700 (15 Feb)	50 (23 Feb)			
2013/14	400 (1-15 Dec)	445 (17 Dec)	600 (5 Jan)	350 (20 Jan)	300 (26 Jan)	600 (3 Feb)	600 (14 Feb)	50 (21 Feb)			
2012/13	350 (2 Dec)	650 (27 Dec)	500 (4 Jan)	400 (12 Jan)	225 (29 Jan)	500 (5 Feb)	350 (19 Feb)	60 (26 Feb)	226 (13 Mar)	7 (19 Mar)	3 (18 Apr)
2011/12	425 (6 Dec)	780 (28 Dec)	625 (3 Jan)	625 (13 Jan)	510 (31 Jan)		520 (17 Feb)	600 (23 Feb)	595 (2 Mar)	100 (17 Mar)	
2010/11	500 (1 Dec)					34 (9 Feb)			300 (13 Mar)	410 (20 Mar)	5 (1 Apr)
2009/10	700 (5-10 Dec)	625 (30 Dec)	400 (5 Jan)							450 (26 Mar)	30 (5 Apr)
2008/09	740 (1 Dec)	1000 (19 Dec)	900	900	900	1000	1000 (16 Feb)	600 (23 Feb)			
2007/08	850 (2-14 Dec)	615 (20 Dec)	850 (2 Jan)	800 (11 Jan)	660 (22 Jan)	450 (3 Feb)	75 (10 Feb)				
2006/07	50 (3 Dec)		500 (7 Jan)	500 (19 Jan)	400 (21 Jan)	700 (9 Feb)	750 (18 Feb)		600 (4 Mar)		
2005/06	525 (4 Dec)	400 (18 Dec)	1 (8 Jan)	400 (15 Jan)						500 (30 Mar)	500 (1 Apr)
2004/05		860 (30 Dec)	400 (2 Jan)	600 (16 Jan)	150 (23 Jan)	300 (10 Feb)					

counted in February. Although there were no submitted counts from Viskadalen in the first 10 days of February, numbers remained at 510-625 through the rest of January and February that year (Tab. 3).

Discussion

These results are the first ever from coordinated TBG annual winter maximum counts from all known sites in NE Jutland. Whilst we cannot exclude the occasional possibility of missing or double counting of birds, we are confident that these counts reflect the maximum numbers of TBG present at these important wintering sites in the past 13 winters. As shown in Fig. 2, there seems to have been a modest 5.3% annual increase in the population within this period, but higher totals in 2011-2012 and 2015-2016 could suggest elevated reproductive success or, more likely, influxes of TBG from wintering sites elsewhere. Unfortunately, age ratios of observed TBG have not been obtained to confirm the first hypothesis. The count data from the TBG wintering areas in Viskadalen in Sweden suggest that these sites are not consistently the source of these influxes, which potentially point to the existence of additional wintering sites used by these geese elsewhere.

NÅD and TLS in the last six years have become less important as discrete wintering areas, since at some stage of the winter, LVM seems to attract the entire flock, which was apparently not the case during 2005-2010 and in 2017. This suggests that these two other sites are now being used more often as cold weather refuges, whereas in the period before 2004-2005, these sites seemed to function more as areas used in autumn and mid-winter and TBG were most numerous at LVM in spring. A displacement of just 50-60 km in a south-westerly direction may seem insufficient to escape

More than 2000 Taiga Bean Geese have been recorded in Lille Vildmose in northern Jutland in recent years, when numbers even have increased – probably due to reduced disturbance. Photo: Dorte and Flemming Sørensen.
Mere end 2000 Taigasædgæs er registreret i Lille Vildmose de senere år, hvor antallene endda er steget – formentlig pga. reducerede forstyrrelser.

cold spells. However, in contrast to LVM, open water is always available in NÅD, where TBG use the river Nørreå and adjacent flooded areas for night roosting and for drinking when other water bodies freeze. During severe weather in winter 2009-2010, deep snow and ice kept TBG from the fields and during this period they fed by head-dipping and up-ending on ice-free sections of the river, as observed in some other years under similar circumstances.

Several factors may explain the change in TBG use of wintering areas. Although we know little about changes in local farming practices that may have reduced the attractiveness of NÅD and TLS to TBG, particularly in autumn, it is evident that the area of preferred feeding habitat, i.e. permanent grassland, has increased at LVM in the last two decades as a result of restoration of former peat cutting areas. Although TBG have been subject to a complete hunting ban in North Jutland since 2004, hunting on other waterfowl, particularly geese, still takes place in the wintering areas. However, since 2014 most of the central parts of LVM, which are heavily used by TBG, have gradually become protected from hunting. This means that hunting today mostly takes place outside of the SPA/Ramsar site at LVM, i.e. in adjacent farmland areas used less regularly by TBG. This is in contrast to NÅD and TLS, where TBG are exposed to disturbance from hunting during September-January, which at times may be intensive even in important feeding areas (T. Brandt pers. obs.). Besides hunting, in the past, peat cutting activities may also have been an important source of disturbance at LVM to TBG. The gradual cessation of peat cutting and associated activities may therefore have contributed to an overall reduction in disturbance to TBG in LVM.

These results confirm the importance of regular counting on the ground to effectively monitor a dispersed population of conservation concern. Because the maximum counts for a discrete group of birds do not always occur during the traditional International Waterbird Counts mid-winter census period, it is vital that NE Jutland TBG continue to be monitored frequently and in a coordinated manner to obtain the best total estimates of their numbers. It is also important to continue to monitor their distribution between the different sites throughout the winter in response to weather, flooding and disturbance to understand better their conservation needs.

Resumé

Bestandsstatus og ændringer i forekomsten af overvintrende Tajgasædgæs i Nordøstjylland

De to underarter af Sædgås, hhv. Tajgasædgås *Anser f. fabalis* og Tundrasædgås *Anser f. rossicus* overvintrer i Nordvesteuropa, herunder Danmark. Bestanden af Tundrasædgæs er på mere end 600 000 individer, mens midvinterbestanden af Tajgasædgæs i 2015 blev anslået til at udgøre ca. 52 600 individer, hvilket svarede til en omtrentlig halvering af bestanden siden midten af 1990erne. Nylige optællinger af forårsrastende Tajgasædgæs i Sverige indikerer dog, at bestanden kan være på mindst 60 000 individer.

I Danmark overvintrede tidligere op til 30 000 Tajgasædgæs, men i de senere år er antallet faldet til mindre end 10 000. Tajgasædgæssene forekommer primært på fem vigtige lokaliteter i Nordjylland og nogle få lokaliteter på Sjælland, Lolland og Falster. For nyligt har GPS- og halsbåndsmærkning af Tajgasædgæs fra Lille Vildmose (LVM) i Nordjylland vist, at denne flok især er tilknyttet dette område, men trækker til Nørreådalen (NÅD) og områder ved Tjele Langsø (TLS) i kuldeperioder (Fig. 1). Flokken kan på denne baggrund betragtes som en separat forvaltningsenhed, selvom der er en vis udveksling af individer mellem flokkene i Nordvestjylland, Sydøstdanmark, Skåne og det østlige Tyskland. Det er derfor vigtigt at overvåge udviklingen i denne delbestand, hvilket forudsætter, at der gennemføres koordinerede optællinger i LVM, NÅD og TLS. Her præsenterer vi for første gang resultaterne af koordinerede optællinger i delområderne gennemført i vintrene fra 2004-05 til 2016-17, herunder de årlige maksimumforekomster, ændringer i udnyttelse af delområderne og udviklingen i delbestanden.

Optællingerne blev gennemført på baggrund af vores forudgående kendskab til Tajgasædgæssenes udnyttelse af habitater i delområderne. Selvom denne metode nødvendigvis resulterer i, at man gradvist finder flere fugle, efterhånden som kendskabet til deres udnyttelse af området øges, vil vi hævde, at optællingerne er repræsentative for Tajgasædgæssenes forekomst i de tre områder.

Der er to iøjnefaldende toppe i maksimumforekomsterne, i henholdsvis januar 2012 og februar 2016, hvilket tyder på, at der i disse vintre var et influx af fugle udefra, som supplerede de lokale fugle (Tab. 1, 2 og Fig. 2). Omkring 700-1000 Tajgasædgæs overvintrer regelmæssigt i Viskadalen, Västra Götaland, Vestsverige, og halsbåndsaflæsninger indikerer en vis udveksling mellem flokken dér og LVM. Derfor præsenterer vi også optællinger fra Viskadalen (Tab. 3).

Maksimumforekomsterne i delområderne viser, at bestanden siden vinteren 2004-05 har haft en årlig vækst på 5,3 %. Tajgasædgæssene ankommer typisk til LVM i oktober og november, hvorefter dele af flokken trækker videre til NÅD og TLS, hvor de største antal forekommer i januar/februar (Fig. 3). Der er typisk flere Tajgasædgæs i NÅD og TLS, når temperaturen i januar er under 3 °C, hvilket formentlig skyldes, at der selv i kuldeperioder er åbent vand i NÅD og TLS. Siden 2011 har maksimumforekomsterne af Tajgasædgæs i Nordøstjylland i de fleste år stort set været identiske med forekomsterne i LVM, mens der i perioden før 2011 ikke var en tilsvarende sammenhæng (Fig. 5). Denne ændring kan muligvis skyldes forbedrede fourageringsmuligheder på permanente græsarealer i LVM og mindre jagtlig forstyrrelse, end det er tilfældet i NÅD/TLS. Desuden må det gradvise ophør af tørvegravning i LVM formodes at have reduceret det generelle forstyrrelsesniveau i området. Hvad influx af fugle fra andre områder angår, tyder tallene på, at der kun i et ud af fire år ankom flere fugle, når temperaturerne faldt under -3 °C i nærliggende svenske områder (Fig. 4).

Maksimumforekomsterne på over 2000 Tajgasædgæs i januar 2012 og februar 2016 kunne ikke forklares med et eventuelt tiltræk af fugle fra Viskadalen i disse perioder. De store forekomster kan således skyldes, at ynglesuccesen var særlig høj i disse år, eller mere sandsynligt, at der var et tiltræk af fugle fra ukendte lokaliteter. Der findes desværre ingen oplysninger om aldersfordelingen i flokkene, som kunne have bekræftet førstnævnte hypotese.

Igennem de seneste seks år har NÅD og TLS gradvist mistet deres betydning som overvintringsplads, idet LVM i løbet af vinteren synes at huse den samlede bestand, hvilket ikke var tilfældet i perioden fra 2005-10 (og 2017). NÅD og TLS benyttes derfor primært i frostperioder, hvor Tajgagæssene her har adgang til åbent vand i Nørreåen og på tilstødende, oversvømmede arealer.

Flere faktorer kan have medvirket til dette skift i overvintringsområde. I LVM er arealet med permanent græs øget i de seneste to årtier, ligesom der nu primært er jagt i omgivende områder, der kun udnyttes sporadisk af flokkene. I de centrale områder af LVM er den jagtlige forstyrrelse blevet mindre i de senere år. I NÅD og TLS er Tajgasædgæssene derimod udsat for jagtlig forstyrrelse i de primære fourageringsområder. I LVM kan det gradvise ophør i tørvegravningen og tilknyttede aktiviteter have bidraget til en generel reduktion af forstyrrelsesniveauet.

Resultaterne understreger, at man ved at gennemføre regelmæssige, koordinerede optællinger kan sikre en effektiv overvågning af bestanden. For at kunne forstå bestandens beskyttelsesbehov er det desuden vigtigt at overvåge dens udnyttelse af de enkelte delområder i forhold til vejrlig, oversvømmelse og forstyrrelse.

References

Aarvak, T. & I.J. Oien 2009: Monitoring of Bean Goose in Finnmark County, Norway. Results from 2008. – Norwegian Ornithological Society Report No. 2-2009.

Artportalen 2017: https://www.artportalen.se (extracted August 2017)

Bibby, C.J., N.D. Burgess, D.A. Hill & S. Mustoe 2000: Bird Census Techniques. Second Edition. – Academic Press, London.

Brandt, T. 2007-16: Sædgås. – Fugle og Dyr i Nordjylland/Nordjyllands Fugle 2006-2015.

Burgers, J., J.J. Smit & H. van der Voet 1991: Origins and systematics of two types of the Bean Goose *Anser fabalis* (Latham, 1787) wintering in The Netherlands. – Ardea 79: 307-316.

de Jong, A., T. Heinicke, T. Aarvak & I.J. Øien 2013: Movements of Tundra Bean Goose *Anser fabalis rossicus* neck-banded in northern Scandinavia. – Ornis Norvegica 36: 28-31.

Fox, A.D. & J. Madsen 2017: Threatened species to super-abundance: The unexpected international implications of successful goose conservation. – Ambio 46 (Supplement 2): 179-187.

Fox, A.D., B.S. Ebbinge, C. Mitchell, T. Heinicke, T. Aarvak *et al.* 2010: Current estimates of goose population sizes in the western Palearctic, a gap analysis and an assessment of trends. – Ornis Svecica 20: 115-127.

Heinicke, T. 2010: Tundra Bean Goose *Anser fabalis rossicus* during spring migration in northern Sweden – rare visitor or regular passage migrant? – Ornis Svecica 20: 174-183.

Madsen, J., G. Cracknell & A.D. Fox (eds.) 1999: Goose Populations of the Western Palearctic. A review of status and distribution. – Wetlands International Publ. 48.

Marjakangas, A., M. Alhainen, A.D. Fox, T. Heinicke, J. Madsen *et al.* 2015: International Single Species Action Plan for the Con-

servation of the Taiga Bean Goose *Anser fabalis fabalis*. – African-Eurasian Waterbird Agreement Technical Series No. 56.
Scott, D.A. & P.M. Rose 1996: Atlas of Anatidae Populations in Africa and Western Eurasia. – Wetlands International Publ. 41.
Skyllberg, U. 2015: Numbers of Taiga Bean Geese *Anser f. fabalis* utilising the western and central flyways through Sweden during springtime 2007-2015. – Ornis Svecica 25: 153-165.
Tutiempo 2017a. http://www.tutiempo.net/clima/Aalborg/60300.htm
Tutiempo 2017b. http://www.tutiempo.net/clima/Goteborg_Landvetter/25260.htm
van den Bergh, L. 1999: Tundra Bean Goose *Anser fabalis rossicus*. In: J. Madsen, G. Cracknell & T. Fox (eds.): Goose Populations of the Western Palearctic. A Review of Status and Distribution. – Wetlands International Publ. 48: 38-66.

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Videnskabeligt Udvalg giver støtte til projekter

DOFs Videnskabelige Udvalg (VU) yder begrænset økonomisk støtte til fagligt ornitologisk arbejde på baggrund af en skriftlig ansøgning. VU støtter projekter med relevans for dansk ornitologi og fuglebeskyttelse.

Udover økonomisk støtte til DOFs faglige grupper og fuglestationer har VU i de senere år ydet støtte til en række feltornitologiske projekter. Der er bl.a. givet støtte til årlige optællinger af ynglefuglene på Ertholmene, til undersøgelser af ind- og udvandring mellem baltiske alkekolonier, overvintrende Sortgrå Ryle i Danmark, betydningen af bekæmpelsen af Duehøg ved fasanudsætningspladser, home range og habitatpræferencer hos Stor Flagspætte, til monitering af Rød Glente, til deltagelse i en havfuglekonference samt til feltarbejde i Kenya

Støttebeløb udgør normalt højst 5000 kroner. VU yder ikke støtte til løn. Ansøgninger bør indeholde følgende elementer:

- Formål med projektet
- Metode
- Forventede resultater
- Publiceringsplaner

Støtte gives for et år af gangen. Ansøgninger til længerevarende projekter modtages også, dog maksimalt af tre års/sæsoners varighed. Støtte udover et år betinges af, at VU fortsat har penge til uddeling.

Det forventes af projekter, der modtager støtte fra VU, at foreningens medlemmer orienteres om projektet ved en eller flere artikler i et foreningens medier, samt at danske optællingsresultater indtastes i DOFbasen.

Uddelingen finder normalt sted i begyndelsen af et nyt år, men ansøgninger kan modtages hele året. Da der typisk er flest midler til rådighed i begyndelsen af kalenderåret, anbefaler VU dog, at ansøgninger om projektstøtte er VU i hænde senest 15. februar.

Ansøgninger sendes til udvalgets sekretær, Thomas Vikstrøm, i en mail med relevante vedhæftninger thomas.vikstroem@dof.dk.


Foto: Tine Stampe