Breeding conditions for waders in Russian tundras in 1991

V.K. Ryabitsev

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Most observers working in tundra habitats in 1991 had the impression that in different regions between the White Sea and the Anady'r Plateau the breeding success of waders was moderate or high. The prognosis made in 1990 that the 1991 breeding season would be successful for waders, appeared to be correct for the greater part of the Eurasiatic tundra. Only in the Western Taimyr, where the number of lemmings had started to decrease, and in southern Yamal, in places with low lemming abundance, was bird breeding success unexpectedly low. More detailed studies carried out in northern and central Yamal and in northern Taimyr confirmed these impressions. Though the density of lemmings was not maximal in all places, their numbers were great enough to attract mammal and avian predators. This gave the possibility of higher breeding success for waders and other small birds. Low breeding success of waders, besides the Western Taimyr, was noted only in coastal habitats of the Murmansk region, and locally in Yakutia and Chukotka.

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Впечатление большинства наблюдателей, проводящих полевые работы в тундровых биотопах, было единодушно в отношении того, что успех размножения куликов в 1991г. был средним или высоким в разных районах между Белым морем и Анадырским плоскогорьем. Сделанный в 1990г. прогноз благоприятного сезона для размножения куликов летом 1991г., в основном, кажется, оправдался для большей части тундр Евразии. И только на Западном Таймыре, где начался падеж леммингов, и на юге Ямала, в местах низкой численности леммингов, результаты размножения птиц оказались неожиданно низкими. Общее впечатление наблюдателей подтверждено более детальным изучением успеха гнездования куликов на Среднем и Северном Ямале, а также на севере Таймыра. Не во всех местах численность леммингов достигла максимальных значений, но и этого было достаточно для того, чтобы снять пресс хищничества песца и пернатых хищников, обеспечив высший успех размножения куликов и других мелких птиц. Помимо Западного Таймыра низкая продуктивность куликов была зарегистрирована лишь на Мурманском побережье и местами в Якутии и на Чукотке.

Introduction

This is the fourth paper describing the breeding conditions for waders in the Russian tundras, the source of most waders migrating through/to Europe and Africa. In the first such review, covering the 1988 breeding season (*Wader Study Group Bull.* 57: 40-41), it was possible to gather data from 13 sites. Every year since then, however, the information seems to become more complete, with the number of sites included becoming higher and higher (*Wader Study Group Bull.* 64: 51-54; 67: 57-62). For 1991 it has been possible to gather details for 25 sites. As for previous reviews, each of the following numbered sections refers to an area shown on the map (Figure 1), and the name(s) of the relevant informants are given at the end of each section.

Some terms describing different types of tundra habitats are used. Four main types are mentioned, distributed zonally from the south to the north, and

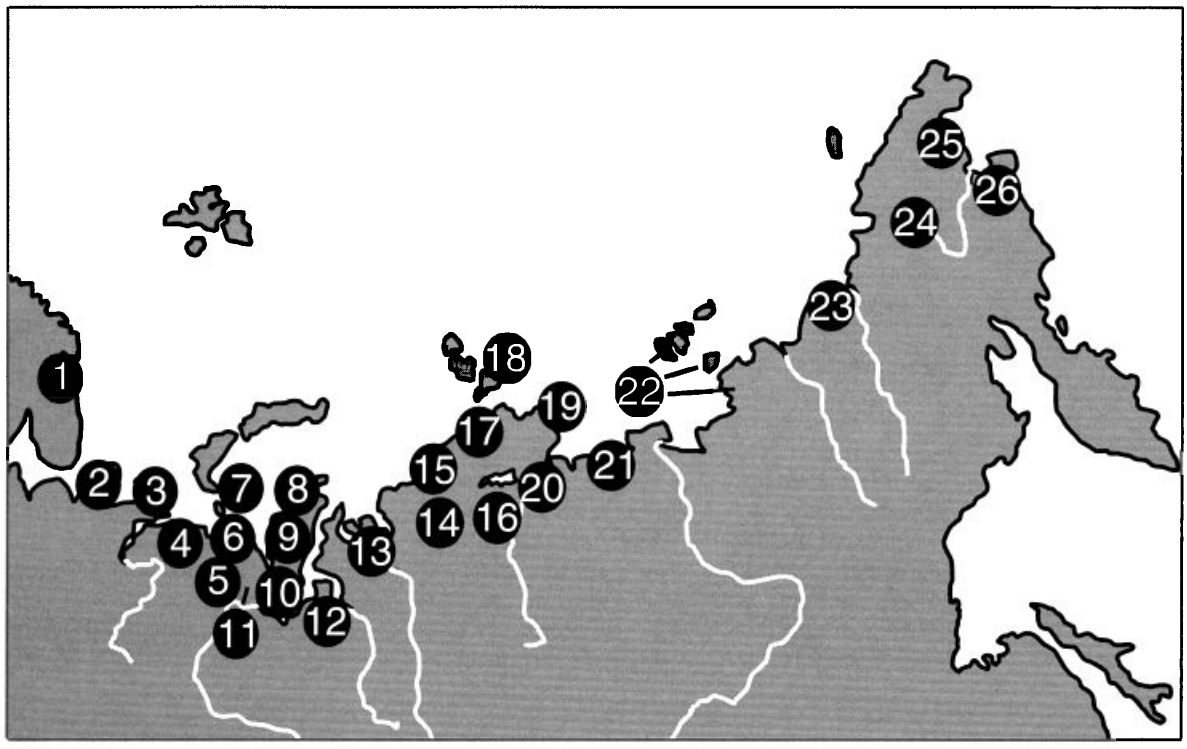

Figure 1. Localities mentioned in the text

called: southern tundra (= shrub tundra), typical tundra (= moss-lichen tundra), arctic tundra (with patches of bare soil and mostly vascular plants) and polar desert (Chernov 1985).

During the summer of 1990 the growing abundance of lemmings was noted in some regions. From these observations it was predicted that the 1991 breeding season would be very good for waders all over the vast Palaearctic tundras (*Wader Study Group Bull.* 67: 57-62). These predictions are compared against the real situation below.

1. Western Murmansk region - Aynovy Islands

Spring started early. In April, snow cover had already disappeared almost completely from the islands and the mainland coast. At the beginning of May, however, the weather changed for the cooler and the temperature was relatively low during the whole summer. Spring and especially autumn migration was observed much later than usual. Additionally, the autumn migration of many species was unusually prolonged, although its intensity was at average levels, and higher than in the previous year. Not many waders bred. Their breeding was successful and the absence of rain during the period of chick growth additionally created favourable conditions.

I.P. Tatarinkova

2. Kola Peninsula - Murmansk coast

Spring was late and prolonged cool weather with periodical droughts predominated during summer. The abundance of the Norwegian Lemming *L. lemmus* was very low (they were met only occasionally at the beginning of August).

Yu.V. Krasnov

3. Kanin Peninsula - western coast (vicinity of Shoyna)

Snow cover melted earlier than usual, although other seasonal phenology was normal. In mid-June strong winds occurred. Signs of lemming activity (marks, tracks, traces) were not discovered. Voles were very numerous in willow thickets. Rough-legged Buzzard *Buteo lagopus* and Snowy Owl *Nyctea scandiaca* bred. Those waders common in the area occurred more numerously than in 1990: Temminck's Stint *Calidris temminckii*, Dunlin *C. alpina*, Ruff *Philomachus pugnax*, Red-necked Phalarope *Phalaropus lobatus* and some others. Waders bred at usual times and their nests were predated moderately (mainly by the Arctic Skua *Stercorarius parasiticus*). Winter hunting (1990/91) for the Arctic Fox *Alopex lagopus* was extremely successful.

V.V. Leonovich & A.V. Filchagov

4. Western Bol'shezemel'skaya Tundra - basin of the Laya & Shapkina rivers

Spring was early and warm; summer prolonged and rainy. The abundance of Siberian Lemming *Lemmus sibiricus* was moderate, but it was high for Ruddy Vole *Clethrionomys rutilus* and maximal for Narrow-skulled Vole *Microtus gregalis*. Rough-legged Buzzard and Long-tailed Skua *Stercorarius longicaudus* bred successfully. Breeding success of the Willow Grouse *L. lagopus* was extremely high; that of waders seemed to be high also.

A.N. Petrov

5. Eastern Bol'shezemel'skaya Tundra

Within southern and typical tundras, spring was exceptionally hot and quick: on 23 May air temperature exceeded 20°C and it was the same up to the end of June. The ice on rivers broke-up on 26-31 May, all seasonal phenology took place about one

month earlier (!) than usual. Summer was cool and wet with summer-floods, especially intensive in mid-July. Within typical tundras and in northern part of southern tundras the number of both lemming species (Siberian Lemming and Collared Lemming *Dicrostonyx torquatus*) and Narrow-skulled Vole was maximal. In the southern part of the southern tundras, the abundance of Siberian Lemmings was high, it was maximal for Narrow-skulled and Ruddy Voles, and it was also high for some other small mammals (Short-tailed Vole *Microtus agrestis*, Ground Vole *Arvicola terrestris* and Arctic Shrew *Sorex arcticus*). The density of Arctic Foxes was high in the northern part of the area and low in the south. Snowy Owl, Rough-legged Buzzard, Hen Harrier *Circus cyaneus* and skuas bred numerously and successfully.

In the lower Kara river area (east side, in the north to 68°50 N and in the east to the Baydaratsk Bay of the Kara Sea), the density of lemmings was moderate and Narrow-skulled Vole density was maximal. Arctic Foxes were not numerous. Rough-legged Buzzards bred numerously, although Snowy Owl did not breed numerously and had low breeding success. Pomarine Skuas *Stercorarius pomarinus* did not breed. Generally, in the whole region, wader breeding success was higher than average.

V.V. Morozov

6. Yugorskiy Peninsula

In the northern part of the Peninsula spring was a little earlier than usual and in the south it was clearly earlier and warm. Summer was cool and rainy, with strong floods. Densities of both lemming species and Narrow-skulled Vole were maximal. Arctic Foxes were very numerous: all dens were occupied and litters were large: 9-13 cubs per pair. Breeding success of predators was very high: more than 60% of Pomarine Skuas raised two nestlings, Snowy Owls had five to nine nestlings per pair, and Rough-legged Buzzards had three to six nestlings. Breeding success of all wader species was high.

V.V. Morozov

7. Vaigach Island

Spring was as usual, the summer cool with a lot of mist. In the northern part of the Island, in arctic tundra habitats, densities of lemmings and Arctic Foxes were low. Amongst birds of prey, only Rough-legged Buzzards were breeding, but at low density. Breeding of waders and geese was as normal and breeding success was high.
In the central part of the island, the number of lemmings was maximal and in the southern part their abundance was higher than on average, but not yet maximal. Arctic Foxes reproduced very successfully (8-12 cubs per pair). Predators in that part of the island bred numerously, mainly Rough-legged Buzzard, Snowy Owl and Pomarine Skua. Breeding success of waders and geese was high.

V.V. Morozov

8. Northern Yamal - station "Yaybari" (71° 04' N)

Spring was very early. The ice broke-up on 5-8 June. Snow cover melted almost completely within the first ten days of June. Summer was moderately warm, without long cool periods. Siberian Lemmings reproduced very numerously and successfully during summer. Amongst raptors, only Pomarine Skuas bred at high density (2.4 pairs/km^2) but their pressure on waders was not marked because of the fair density of rodents. Foxes bred successfully, but they were not numerous. Of 17 nests of Grey Plover *Pluvialis squatarola*, 16 hatched chicks (the female from 17th nest was caught by a Peregrine Falco peregrinus). Nesting success of Dunlin was 89% (of 18 nests) and of Little Stint was 83% (of 24 nests). General wader incubation success was estimated as 82%. During the time of tending chicks, conditions appeared favourable and most chicks fledged.

V.K. Ryabitsev & K.V. Ryabitsev

9. Central Yamal - station "Khanovey" (68°40'N)

Spring was very early, the summer cool but without very cold periods and heavy rains. Breeding density of most wader species was a little higher than average. The density of Red-necked Phalarope was twice as high as the previous year (32.5 pairs/km^2). The density of the Ruff was relatively high (15 nests/km^2). Little Stints did not occur. The density of lemmings, especially of the Siberian Lemming, increased in comparison with their number in previous year and was estimated as moderate. Amongst raptors only Rough-legged Buzzards were fairly numerous (0.54 pairs/km^2): the density of Long-tailed Skuas and Arctic Skuas was much lower (0.04 pairs/km^2 and 0.09 pairs/km^2 respectively). Snowy Owls did not occur. Breeding success of waders was not high, most probably because of the activity of non-breeding skuas. Fourteen nests of Ruff (of 22 found), seven nests of Red-necked Phalarope (of 15 found) and two nests of Wood Sandpiper *Tringa glareola* (of five found) were destroyed by skuas. They, together with Rough-legged Buzzards, reduced the number of wader chicks quite considerably.

N.S. Alekseeva, E.A. Polents & Yu.A. Tyulkin

10. Southern Yamal - basin of the Pravyi Nuribey

Spring was early and as a result the arrival and breeding of many birds took place about two weeks earlier than usual. No extreme weather changes during the breeding season were noticed. The abundance of rodents increased a little. The proportion of occupied dens by Arctic Foxes increased to 20%-30%. Rough-legged Buzzard bred in high density, Long-tailed Skua and Arctic Skua *Stercorarius parasiticus* were common, and the Snowy Owl was met only locally. Golden Plover *Pluvialis apricaria*, Pacific Golden Plover *P. fulva*,

Grey Plover and Ringed Plover *Charadrius hiaticula* bred successfully.

S.P. Paskhalny

11. Southern Yamal - middle Shchuchya river

Spring was the earliest of the last 18 years: ice on rivers disappeared in mid-May, and snow in the tundra melted completely by mid-June. Summer was prolonged and rainy. The density of Narrow-skulled Vole was very high, and of Ruddy Vole and lemmings it was fairly high. Long-tailed Skua, Snowy Owl and Rough-legged Buzzard bred numerously. The proportion of birds in the diet of Rough-legged Buzzard (according to pellet analysis) was considerable. Along the river, Common Sandpiper *Actitis hypoleucos* was more numerous than normal and the Terek Sandpiper *Xenus cinereus* was quite abundant. Amongst waders breeding in the tundra, Ruffs were absent and the abundance of other waders was lower than usual. They occurred patchily (particularly Whimbrel *Numenius phaeopus* and Bar-tailed Godwit *Limosa lapponica*).

S.A. Mechnikova

12. Tazovskiy Peninsula

In the area of the confluence of the Poylova-Yakha and Ngarka-Khorvuta rivers (southern tundras) the timing of ice break-up on rivers did not differ from the long-term average. Summer was hot and dry. From visual estimation, the abundance of both Siberian and Collared Lemmings were high. Rough-legged Buzzard, Peregrine *Falco peregrinus*, Long-tailed Skua, Arctic Skua and Snowy Owl bred successfully. Terek Sandpiper and Temminck's Stint were numerous on breeding sites close to rivers, Red-necked Phalarope was numerous in more wet tundra habitats; Golden Plover, Ringed Plover, Wood Sandpiper, Ruff, Common Snipe *G. gallinago* and Pintail Snipe *G. stenura* were common. Grey Plover, Spotted Redshank *Tringa erythropus*, Whimbrel and Bar-tailed Godwit occurred rarely. Generally the breeding success of waders was high.

V.A. Yudkin & V.G. Kozin

13. Mamonta Peninsula

In the arctic tundra lemming abundance was high and Arctic Foxes bred. Snowy Owls had big clutches (eight to nine eggs); close to owls Brent Geese *Branta bernicla* bred, and it is probable that also Red-breasted Geese *Branta ruficollis* bred also. Skuas and Rough-legged Buzzards were breeding. Breeding success of waders seemed to be high.

V.S. Zhukov & D.I. Ivanov

14. The Taimyr

In the western part of the Taimyr arctic tundras, at the end of winter, the abundance of lemmings was noted as maximal. Before dispersal to new areas they started to die. In typical tundras their abundance persisted at relatively high levels. Predators (both foxes and birds) reproduced successfully. Snowy Owls spread to southern tundras to breed and they had big clutches there. The proportion of dens occupied by Arctic Foxes in the western Taimyr was 38%-40% in arctic tundras, and up to 90% in typical tundras (Ust-Tareya). In eastern Taimyr these proportions were respectively 64% (Bikada river) and 81% (Khatanga Bay coast). In mid-July, in the basin of the Pura river, the abundance of waders attending chicks was low; in the Piasina delta, at the end of July it was also lower than in 1990.

Ya.I. Kokorev

15. Western Taimyr - the Pyasina delta

Spring seemed to be very late and about 50% of the area was still snow-covered on 25 June. Later on, however, the weather was generally mild with the air temperature often exceeding 20°C (up to 30°C). Lemmings were extremely numerous in mid-June when snow melted, but the population crashed afterwards and not many animals survived to mid-July. Pomarine Skua bred densely (*c.* 2 nests/km^2). Snowy Owl and Rough-legged Buzzard bred also. Wader densities appeared to be rather low, probably as a result of the late spring. Little Stint *Calidris minuta* was the most numerous breeding wader (up to 60 nests/km^2 on a 0.25 km^2 plot), followed by the much less numerous Curlew Sandpiper *Calidris ferruginea* and Pacific Golden Plover. Dunlin C. alpina, Grey Plover, Turnstone *Arenaria interpres*, Red-necked Phalarope and Grey Phalarope *Phalaropus fulicarius* were all scarce. Ringed Plover bred along the sea shore (0.6 pairs/km). Clutch predation by Arctic Foxes was very heavy, and *c.* 80% of nests were eventually predated. Such heavy fox predation in a lemming peak-year was surprising and might be the result of rapid declines in lemming numbers in late June and/or the presence of a specialised fox individual in the study area.

P. Chylarecki & W. Kania

16. Central Taimyr - middle Verkhnaya Taimyra

In the area of typical tundra there was a normal spring. Snow-cover was not very thick and it melted quickly. The first half of summer was warm, and August was rainy. It snowed on 24 July. The abundance of lemmings and Arctic Foxes was the highest of the last nine years. All dens found in a plot of 110 km^2 were occupied by Arctic Foxes (12 pairs). In the same area, 11 Snowy Owl nests were found with 8-11 nestlings/nest. Pomarine Skuas were also numerous. Ducks, geese and Rough-legged Buzzards bred successfully. The season was favourable for waders.

A.A. Gavrilov

17. Central Taimyr - northern part, Knipovich Bay region

In this area of arctic tundra the spring started one week earlier than in 1990, as a result of thinner snow-cover. Snow melted rapidly and ice broke-up on small rivers on 22 June. Mild weather in the first half of July was favourable for birds. However, a cyclone with snow storms between 19 and 23 July resulted in deep snow-cover that caused the death

of many wader broods and some late clutches. The abundance of the Siberian and Collared Lemmings was moderate and their summer reproduction was good. Arctic Foxes and Snowy Owls did not reproduce and they almost did not occur. The number of breeding skuas increased a little in the season, but only a few Pomarine Skua bred. Egg-hatching success in waders was high for Grey Plover (94%), Knot *Calidris canutus* (84%), and Turnstone; it was moderate for Sanderling *Calidris alba* (61%), Little Stint (47%) and Curlew Sandpiper (40%). Taking into consideration the influence of weather on wader broods, it was estimated that the success of their breeding was moderate or a little lower than average.

M.Yu. Soloviev, P.S. Tomkovich, O. Hilden & V.O. Yakovlev

18. Severnaya Zemlya Archipelago - Bol'shevik Island

The tundra habitat of this site is called a polar desert. Weather conditions were not favourable for birds. Summer was extremely short and cool. Air temperature from mid-July to mid-August was about 0° C, and only on 27 July did it reach +6°C. Heavy cyclones with snow occurred twice during summer. The population of the Collared Lemming was at a minimal stage of abundance. Breeding success of the only wader, Purple Sandpiper *Calidris maritima*, was moderate. The breeding period was relatively prolonged.

A.E. Volkov, V.I. Pridatko & V.I. Bulavintsev

19.North-eastern Taimyr - arctic tundras in the vicinity of the Pronchishchev lake

Snow melted late, at the beginning of July. Weather in the first twenty days of July was mild and relatively warm, whilst from 21 July to mid-August it was rainy, misty and cold. On 22-23 July the tundra was covered with snow. The density of lemmings was high, and of Arctic Foxes, moderate. The influence of foxes on bird clutches was not noted. Snowy Owl, Pomarine Skua, Long-tailed Skua, Herring Gull *Larus argentatus* and Glaucous Gull *L. hyperboreus* all bred successfully. Owls occurred densely and had large clutches (8.5 eggs/ pair). Breeding was successful for the Curlew Sandpiper, Turnstone, Little Stint, Grey Plover, Pacific Golden Plover, Sanderling and Ringed Plover. Single nests of Knot and Dunlin were found. Total density of breeding waders on a 12 km^2 plot was 67 nests and families.

E.E. Syroechkovsky jr., E. Lappo, V. Karpov, L. Underhill, R. Prys-Jones, R. Summers, H. Schekkerman & M. van Roomen

20. Eastern Taimyr - lower Bolshaya Balakhnya river

In this area of typical tundra the spring came 7-10 days later than usual. It delayed the breeding of waders a little. Summer weather was favourable for birds. On 21-22 July snow occurred, but it disappeared quickly. At the end of June/beginning of July, nests of some waders situated close to the river (especially of Temmincks Stint) became flooded because of high water. Arctic Fox was not abundant. The number of lemmings (particularly of Siberian Lemming) was high and their predators, mainly Snowy Owl and Pomarine Skua, were breeding. Total predator pressure on wader clutches was not considerable.

P. Yesou

21. Coastal part of the region between Anabar and Olenek rivers - basin of the Oyulakh-Yuryakh river

The weather in the first half of August was hot, although showers occurred occasionally. The abundance of lemmings was lower than moderate, of Arctic Foxes - moderate. The density of breeding waders was low, but relatively high for ducks. Little Stint, Pacific Golden Plover, Pectoral Sandpiper Calidris melanotos, Grey Plover, Curlew Sandpiper and Dunlin were alarming with broods. Herring Gull, Glaucous Gull, Long-tailed Skua and Pomarine Skua all bred at low or moderate density.

E.E. Syroechkovky jr., E. Lappo, A. Filchagov & P. Yesou

22. Between rivers Yana & Indigirka - Shirokostan Peninsula in the vicinity of Bustakh lake and SW coast of Bolshoy Lyakhovskiy and Kotel'ny Islands (Novosibirskiye Islands)

The abundance of both lemming species was high or very high in July to September. Weather was mild everywhere, locally the temperature was higher than the average for many years (in Tiski up to 32°C). Cooler weather and the onset of snow started one to two weeks later than usual. Many owls with young and Arctic Foxes appeared at the coast of the Bolshoy Lyakhovskiy Island.

N. Kutuzov

23. Lower Kolyma

In the region of the confluence of the Bolshaya Konkovaya and Malaya Konkovaya (158° 30' N, 69° 30'E) breeding of waders occurred at the usual time. Spring floods occurred because of thick snow cover. Therefore waders bred patchily, but at high density. June was cool and July hot. The abundance of Siberian Lemming increased twice but did not reach the maximal levels. Arctic Foxes were not numerous. Snowy Owl did not breed. Long-tailed Skua, Arctic Skua and Short-eared Owl *Asio flammeus* bred. Generally the breeding season was very successful for all waders.

E.R. Potapov & V.V. Gavrilov

24. Anadyr' Plateau - the Elgygytgyn lake

Summer was exceptionally hot and dry: daily air temperatures exceeded 20°C. The abundance of Collared Lemming was at a peak stage and of Siberian Lemming was minimal. Numbers of Tundra Vole *Microtus oeconomus* were low. Predators (both mammals and birds) did not influence markedly the breeding success of waders.

I.V. Dorogoi

25. Anadyr' Liman (vicinity of Anadyr' and Zemlya Geka)

The abundance of lemmings and other rodents was low or very low.

I.V. Dorogoi

26. Anadyr' Liman - south-eastern coast

Before the break-up of river-ice (10 June) the weather was windy and misty, it was very hot and dry afterwards. The number of lemmings after winter was moderate. Summer weather was abnormally hot and dry: to the end of August short-term rains occurred only four or five times. Arctic Foxes in Avtatkuul river valley seemed to feed mainly on ptarmigans. Live lemmings were not met. Ruddy Vole occurred quite numerously in the river flood plain.

A.V. Kondratyev

Conclusion

In the coastal territory of the Murmansk region the abundance of lemmings has been low for four years. On the Kanin Peninsula lemmings were also not numerous. In the eastern part of European tundras (Bolshezemelskaya Tundra, Yugorskiy Peninsula, Vaigach Island) lemmings were numerous, though not at the periphery of this region. The maximal density was observed in northern part of the Yamal Peninsula. In the central and southern part of the Peninsula, the abundance of lemmings was estimated as moderate or even low. Both lemming species were highly numerous on the Gydan Peninsula and in a great part of the Taimyr. Their numbers, however, were not steady within the whole Taimyr. Lemmings were most abundant in the central part of the Taimyr, and their abundance was lowest in the northern part of the Central Taimyr (to the north of the Byrranga mountains). Lemmings did not occur to the north of the Taimyr on the Bolshevik Island. Strong decreases in lemming numbers were noted by mid-summer in the Western Taimyr. In the great territory of Yakutia (unfortunately the information is rather scarce from there) it seemed that lemmings reproduced numerously everywhere, reaching the peak level of their abundance in the northern part of this region (Yana-Indigirka tundra).

It seemed that the distribution of lemmings on the Chukotka was patchy, as in previous years.

In a situation of increasing numbers of lemmings within a great territory, from the Bol'shezemel'skaya Tundra in the west to the Kolyma in the east, Arctic Foxes and avian-predators had abundant food and highly favourable conditions for reproduction: a high proportion of occupied fox dens, large Snowy Owl clutches and high densities of breeding skuas in some places testified to this. Breeding of Short-eared Owl was noted by some observers in southern tundras. Unexpectedly, the low abundance or absence of Pomarine Skua, Snowy Owl and Arctic Fox were noted there when lemming numbers were moderate in the north of the Central Taimyr; it is very likely that these predators settled in more southern territories.

Spring was early in Europe to the east of the White Sea (besides Vaigach Island) and on the Yamal. Summer was cool without extreme changes of weather in the whole of the European tundras and on the Yamal (the drought was noticed on the Kola Peninsula). Spring started as usual on the Taimyr (a little later in eastern Taimyr): mild summer weather was broken by cyclones with snow afterwards at the end of July and in August. This adversely affected wader chicks in the north of Central Taimyr and on the Severnaya Zemlya archipelago. In Yakutia, Tazovskiy Peninsula and Chukotka the middle and end of summer was hot and dry. This situation could have limited food resources for waders which prefer wetter habitats.

Most observers working in tundra habitats in 1991 had the impression that in different regions between the White Sea and the Anadyr' Plateau the breeding success of waders in 1991 was moderate or high. Only in the Western Taimyr, where the number of lemmings had started to decrease, and in southern Yamal, in places with low lemming abundance, was the bird breeding success unexpectedly low. More detailed studies carried out in northern and central Yamal and in northern Taimyr confirmed these impressions.

The prognosis made in 1990 that the 1991 breeding season would be successful for waders, appeared to be correct for the greater part of the Eurasiatic tundra. Though the density of lemmings was not maximal in all places, their numbers were great enough to attract mammal and avian predators. This gave the possibility of better breeding success for waders and other small birds. Low breeding success of waders, besides the Western Taimyr, was noted only in coastal habitats of the Murmansk region, and locally in Yakutia and Chukotka.

Undoubtedly, as a result of successful reproduction of predators, their autumn abundance allows us to foresee that it will be high in summer 1992. Lemming numbers will decrease in some places or will remain at a high level in others. However, it may be expected that predators will reduce lemming numbers soon and then they may markedly reduce the number of wader clutches. Thus, the breeding success of waders in 1992 is predicted to be low or moderate.

P.S. Tomkovich

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