Occurrence of the Red-flanked Bluetail (Tarsiger cyanurus) in Finland and some remarks concerning its expansion to the west.

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Present occurrence in Finland.

From the recording of *Tarsiger cyanurus* for the first time in Finland (cf. Sovinen 1952 a and b) it has been concluded that a sudden expansion of the species has recently taken place. Sovinen (op. cit.) reported altogether 9 finds in 5 different localities (cf. fig. 1). Subsequent observations have confirmed that the surprising occurrence of this Siberian bird in Finland was not merely an occasional phenomenon.

The following records made since the publication of SOVINEN's paper have been available to the present author.

- 1. On May 28, 1952, a young male or a female was seen by Mr. O. Leivo, M.A., on the island of Söderskär (ca. $60^{\circ}\,10'\,\text{N},\ 25^{\circ}\,25'\,\text{E}$) in the outer archipelago of the Gulf of Finland (according to a personal communication). This individual spent the whole day on the island which is largely barren rock.
- 2. On June 1, 1953, one male (age not determined) sang on the west slope of Jauhovaara hill (ca. 64° 5' N, 29° 5' E) at Katerma, in Kuhmo (observed by the author). The place is in the immediate vicinity of that of Sovinen's record 7 (cf. Sovinen 1952 a). The slope is covered by tall dense spruce forest approaching *Myrtillus* type.
- 3. On June 1 and 3, 1953, I observed an adult male with dark sides of the head singing at Välivaara ca. 1.5 km southwest of Jauhovaara. According to a personal communication from Mr. M. Sovinen, this locality is probably the same as where a singing male *Tarsiger* was seen two years earlier (cf. Sovinen 1952, record 8).
- 4. On June 13, 1953, a singing male was observed at Sanginjoki (ca. 65° N, 25° 45' N) in Oulujoki in an old spruce forest (SEPPÄNEN 1953).
- 5. On June 28 and 29, 1953, a singing male was observed by Mr. A. Reinikainen, M.A., at Valvatinniemi in Konnevesi (ca. 62° 45' N, 26° 30' E; personal information). The bird sang in the top of a tall pine on a slope near a lake shore.
- 6. At the end of May, 1954, Mr. E. Sirviö observed a few singing males in the neighbourhood of Jauhovaara in Kuhmo commune. Mr. Sirviö is an amateur ornithologist living in Kuhmo and had heard *Tarsiger* (later identified by Mr. M. Sovinen) in 1951. Thus it is likely that he would have been able to recognize the species. Mr. Sirviö told me that one singing male was observed on the west slope of Jauhovaara and 2 or 3 individuals near the edges of a large

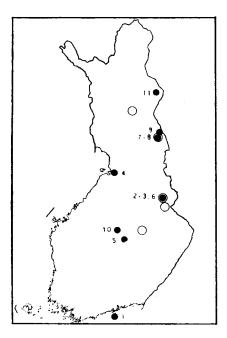


Fig. 1. The finds of *Tarsiger cyanurus* in Finland up to 1951 (published by SOVINEN 1952 a and b, open circles) and subsequently (black circles). The numbers refer to the records in the text.

cleared area ca. 5 km south of Jauhovaara. The spring was interrupted by a period of unusually cold weather, however, and when I came to Jauhovaara at the beginning of June, I was not able to find a single individual of *Tarsiger* in spite of a painstaking search.

- 7. On June 25, 1954, I observed 3 singing males on Valtavaara hill in Kuusamo (ca 66° 10' N, 29° 15' E). The place is almost the same as where Sovinen heard Tarsiger singing 3 years earlier (cf. SOVINEN 1952 a, the record 9). These 3 individuals were found close to the steep slopes of the hill at an altitude of ca. 400—450 m. The habitat differs distinctly from that described in Kuhmo (cf. record 4), consisting of low and open mixed forest of spruce and birch. The habitat »dualism» of Tarsiger will be dealt with in greater detail later in this paper (cf. p. 59—61).
- 8. On June 30, 1954, I found two of the 3 individuals noted before (cf. 7) in their earlier localities. Two more individuals were observed on the northeastern part of Valtavaara hill and one on the southwestern slope of Konttainen hill ca. 5 km northeast of the place where the first individuals were observed. There were thus at least 5 singing males in this hill area.
- 9. Around July 15, 1955, an adult singing male *Tarsiger* was observed by Mr. T. Waaramäki, M.A., according to his personal information on Vattuvaara

hill (ca. 66° 15' N, 29° 20' E) in Kuusamo. This place is only about 8 km northeast of Valtavaara hill (cf. records 7 and 8). The bird was found in an open spruce forest mixed with birch and pine on the top of the hill close to the steep southwestern slope. It was singing at about 10 a.m. in the top of a tall spruce.

- 10. On June 15, 1956, Dr E. Merikallio observed (personal communication) at least one singing male (probably two) at Keiteleenperä (ca. 63° 15' N, 25° 30' E) in Viitasaari. This bird was seen in the top of a tall pine in a forest of fairly luxuriant nature on the slope of a low hill. Not far from this place there was an area of cultivated land.
- 11. On June 29, 1957, Mr. P. Linkola observed (personal communication) 3 singing males on Venehaaroiva hill (ca. 67° 30' N, 29° 21' E) in Salla. These individuals were found in a fairly open mixed forest with spruce as the dominant tree species, not far from the timber line. The distances between the birds were about 300 m.

In addition to the observations presented above, it may be of interest to consider the negative results of several excursions made in areas where Tarsiger had previously been recorded. In early June, 1954, Messrs. M. and P. Sovinen and I visited the areas of Puijonsarvi and Tervonsaari in the vicinity of Kuopio (cf. records 1, 3 and 6, Sovinen 1952 a). We were not able to find Tarsiger there. In the island of Tervonsaari, the tall spruce forest was cut and quite probably this very first locality of Tarsiger to be recorded in Finland no longer afforded a suitable habitat for the species. One week later I visited Kuhmo without finding the species (cf. record 6). Nor was I able to find the species in Kuhmo during my excursions there in early June, 1955 and 1957. In the last week of June 1955 and 1957 I searched in vain for Tarsiger at Valtavaara, Kuusamo. On June 18 and 20, 1956, Mr. P. Seiskari, M.A., visited the areas mentioned in Kuhmo and Kuusamo but did not find the species.

In this connection, it should be pointed out that ornithological records from the vicinity of Kuopio have been kept since the eighteentwenties (e.g. v. Wright 1857 and E. W. Suomalainen 1908) and there are also some data from Kuusamo (Merikallio 1921, Waaramäki 1945 and P. Suomalainen 1952), yet without any record of *Tarsiger*. Thus a recent expansion of this bird (with its distinctive voice) seems quite evident.

Since 1949, *Tarsiger* has been recorded in Finland at least once every year. The localities of the finds are shown in the map (fig. 1).

General distribution.

Very few ornithological data are available from the area of the U.S.S.R. close to the Finnish boundary. Judging from the regular occurrence of the species on the Finnish side of the boundary, *Tarsiger* may perhaps breed in some areas of Soviet Karelia and the Kola

peninsula. This supposition is supported by the observations of MAL-ZEVSKIJ (1947). On August 17, 1937, Malzevskij shot a male Tarsiger in the Lapland State Reserve in the Kola peninsula. Five days later he obtained a female and a young bird with uncompleted first moult in the same locality. Quite probably these birds were of a family which had been nesting in the area. The specimen from Kola mentinoned by SOVINEN (1952 a) is the female shot by Malzevskij. To date, this is the westernmost confirmed record of a female Tarsiger. All the individuals observed in Finland have probably (cf. record 1) been males, in spite of an intensive search for females on several occasions. Of course, the females are also much more difficult to spot than the males because of their cryptic behaviour (cf. e.g. PORTENKO 1937). Thus it is just possible that Tarsiger has already bred in Finland, too. In many species, however, the occurrence of single males is a common phenomenon in populations close to the limits of the range (v. HAARTMAN 1952). Regrettably, it has not been possible to determine the age of every individual of Tarsiger observed in Finland. Both young and adult males have been seen. PORTENKO (1954) has pointed out that males with a pale colour (probably young) are abundant, especially in the western part of the range.

The breeding range of Tarsiger c. cyanurus (Dementjev et al. 1954) is wide, comprising almost the entire taiga zone in Siberia, the mountain forests of Mongolia, the Kamtshatka peninsula, Sahalin and the northern islands of Japan (Fig. 2). From the point of view of the present study, the western limit of the range is especially interesting. According to Stegmann (1932 and 1938) and Portenko (1937), during the first decades of this century the range reached the western slopes of the Ural mountains (cf. e.g. the map of Stegmann, 1938, reproduced by Sovinen, 1952). Unfortunately, the earlier history of the species along the middle reaches of the river Pechora (a State Reserve), where it has been fairly common since 1938 (Teplova 1957), is not known. This area, however, is included in the breeding range of Tarsiger by Dementjev et. al. (1954) (cf. fig. 2).

In the vicinity of Archangel the species has increased in numbers since 1938 and has frequently been observed to breed near the shores of Lake Slobodsk (cf. Dementjev et al. 1954). The find of Malzevskij in Kola has already been mentioned. No other observations of this species between the area of Pechora and Finland are known to the author. This seems to indicate the extreme rarity of the species in

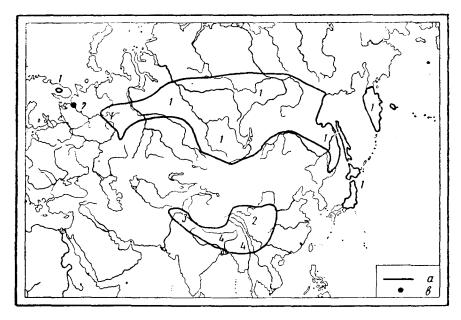


Fig. 2. The breeding range of Tarsiger cyanurus according to DEMENTJEV et al. (1954). 1 T. c. cyanurus, 2 T. c. practicus, 3 T. v. rufilatus, 4 T. c. pallidior.

the European area of the U.S.S.R. Probably, however, the present picture does not represent the entire truth, because of the very limited recent ornithological literature concerning the area in question.

Tarsiger is a typical representative of STEGMANN's Siberian fauna. In this fauna type, however, it belongs to a certain south-Siberian element, which consists of the following 13 species: Muscicapa sibirica, M. latirostris, Muscicapa mugimaki, Phylloscopus proregulus, Herbivocula schwarzi, Tribura thoracica, T. taczanowskia, Turdus dauma, T. obscurus, T. ruficollis, Tarsiger cyanurus, Luscinia sibilans and Luscinia cyane. The distribution centre of these birds after the Ice Age was the taiga refuge in southern Siberia. Tarsiger already had the most extensive range (cf. e.g. Dementjev et al. 1951—1954), which seems to indicate a high capacity for expansion in the species. None of the other species mentioned above has spread to the European taiga.

Probable course of expansion.

It is possible that the appearance of *Tarsiger* in Finland does not foreshadow the extension of the continuous breeding range of the species as far as this country. During the sudden expansion, new areas have been occupied as much as about 1500 km west of the limit of the previously known range. Apparently this has been made possible by long and successful prolongations of the spring migration. In western Siberia, the direction of migration is almost E.-W. (PORTENKO 1937), which, in addition to the occurrence of the species in Finland in late spring and early summer, supports the idea of the influence of prolonged spring migration (cf. e.g. LÖNNBERG 1934 and OTTERLIND 1954).

The European taiga zone from the Ural mountains at least as far as the watershed area near the eastern boundary of Finland seems to be a fairly uniform area, especially as far as concerns the distribution of the Siberian bird fauna. According to STEGMANN (1932), only two (Loxia leucoptera and Cuculus saturatus) of the Siberian species have the western limit of their range between these two regions. Apparently this means that if a Siberian bird species has been able to spread beyond the Ural barrier it has usually spread as far as the mentioned region in Fennoscandia and many species even beyond. The importance of the Ural region (»die Uralschwelle») as a focus of the distributional borders of animal species and subspecies has been pointed out by Stresemann and Sachtleben (1920). Stegmann (1932) also draws attention to the distinct drop in the number of Siberian species close to the Ural region (from 30-33 to 23-26 bird species). The area southwest of the watershed region in eastern Finland seems to have some »barrier» effect upon the distribution of the Siberian fauna in the western part of the taiga. KALELA (1944), SEISKARI and KOSKI-MIES (1955) and VOIPIO (1956), among others, have studied this region and its continuation across Finland to the northwest (cf. also EKMAN 1922, fig. 144). Apparently also the western borders of Phylloscopus borealis and Emberiza pusilla are to be understood as indications of the barrier region (cf. PALMGREN 1938).

It seems that the sudden appearance of *Tarsiger* in Finland represents a phase of dispersal from one barrier to another. As a migrant, it has started the expansion by prolonged spring flights facilitated by the latitudinal direction of migration. In spite of the huge distance

involved, the climatic and biogeographic differences between the Ural mountains and eastern Finland probably do not exceed the ecological tolerance of the species. Of course, it is not possible to complete the spread over such an extensive area as the European taiga in a few years, but now it might be promoted by the new separate distribution centres.

It is generally agreed that the prolongation of migration is stimulated by warm weather (cf. Siivonen and Kalela 1937, Palmgren 1937 and 1938, Otterlind 1954). The expansions and irruptions of many bird species in Northern Europe have been shown to coincide with periods of warm springs or even only of warm spells (cf. Siivonen and Kalela 1937, Kalela 1940 and 1949, Leivo 1946, Swanberg 1948, Välikangas 1951, Edelstam and Snellman 1953, among others). In spite of the heterogenous character of the material, there are some coincidences which suggest the stimulating effect of warm springs upon the spring migration of *Tarsiger*, too.

Fig. 3 presents the yearly variation of the mean of the average temperatures of May and June in Kajaani (ca. 64° 15' N, 27° 45' E) from 1921 to 1957 according to the Monthly Surveys of the Meteorological Office in Finland. The temperatures in Kajaani are here taken to represent the climate of the general

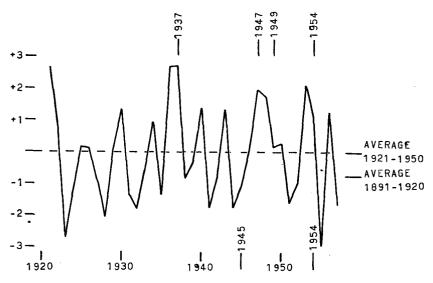


Fig. 3. The yearly variation of the mean of the average temperatures of May and June in Kajaani 1921—1957.

area of the Tarsiger finds in Finland. Since the species evidently arrives in Finland at the end of May or in June, the temperatures of both May and June are taken into consideration. In the Pechora area it arrives in the beginning or middle of May (TEPLOVA 1957) and in Archangel between May 20 and June 4 (DEMENTJEV et al. 1954). An especially noteworthy point is the increase in the average temperature of May during the present century. In Kajaani it was +6.0° C in 1891-1920 and +7.2° C in 1921-1950. A smaller increase has occurred in the average temperature of June (from +12.4° C to 12.7° C). Taking into consideration the large scale of the recent climatic changes (cf. WAGNER 1940), this increase in the spring temperatures probably extends its effect over the northern part of European U.S.S.R., too. During the generally warm springs, exceptionally warm periods wich may stimulate the birds to prolonged migration have occurred more often than usual. It can be demonstrated that many of the most interesting events of the expansion of Tarsiger have also coincided with warm springs (cf. fig. 3). In the Kola peninsula the species was observed (MALZEVSKIJ 1947) in the latter of two successive years with unusually warm springs. In 1947, Tarsiger was more abundant than usual in the Pechora area (TEPLOVA 1957). The first record of the species in Finland was made in a year (1949) following two warm springs and with a May-June temperature rather higher than the average for 1921-1950. The reports of several individuals in Kuusamo in 1954 coincide with a warm spring following one that was even slightly warmer. It seems that two or more warm springs in succession have especially promoted the expansion.

In spite of some rather cold springs, Tarsiger has been found in Finland every year since 1949. In general, the return of birds to their breeding locality also seems to be fairly independent of the weather (cf. Svärdson and Durango 1951). However, according to Teplova (1957) the species was very rare in the Pechora area in 1945 and 1954. In Kajaani the spring of 1945 was the later of two successive cold springs. Evidently the meteorological conditions along the long migratory route of the species have some effect upon the population at the very limit of the range. Thus the expansion of Tarsiger seems not to have taken place simply because of the warm springs in Northern Europe. Apparently it also depends upon a population pressure regulated by meteorological conditions in the more eastern part of the migratory route as well as by other factors within the breeding range and the wintering area.

Tarsiger cyanurus has its winter quarters in Southern China, Hainan, Formosa and probably in India as well (HARTERT 1910). According to PORTENKO (1937), it does not migrate through the Turkmen S.S.R. Probably it migrates only through Mongolia and thus has at first to fly almost due east in autumn. However, the species has been recorded 5 times in Western and Southern Europe in autumn.

1. At the end of November, 1879, a female was obtained near Pisa in Italy (GIGLIONI 1886).

- 2. A probable record of an adult male i Lincolnshire, England, between September 19 and 21, 1903, has been reported by the editors of British Birds (1954).
- 3. On October 7, 1947, a young bird was obtained at Whalsay in the Shetlands (BRUCE 1948).
- 4. On October 9, 1956, a young female was captured on the island of Mellum in Germany (DOHLE et al. 1957).
- 5. On October 28, 1956, a first-winter male was obtained at Sandwich Bay, Kent, England (HARLE 1958).

These records seem to be only of accidental character and they need not be considered as indicating the existence of a migratory divide ("Zugscheide", cf. Rudebeck 1950). Otterlind (1954) thinks that such migratory deviations in autumn may tend strongly to counteract any increase in the populations of Emberiza pusilla and Phylloscopus borealis in Fennoscandia. Such migratory anomalies seem so rare in Tarsiger that they should not have any notable effect upon its populations. Aberrations such as those observed in Tarsiger may happen because of migratory induction. In Lincolnshire, for instance, the bird appeared in company with a rich wave of other migrants (especially Redstarts).

Habitat.

Tarsiger seems to occupy two distinctly different types of habitat. According to Sovinen (1952 a), in Finland it prefers "pure or mixed spruce forests of fairly luxuriant nature". Sovinen (op. cit.) especially emphasizes the importance of abundant decaying logs. This type of habitat is illustrated in fig. 4., which, for technical reasons, does not, however, represent the densest part of the forest in the locality. A good description of this type of habitat is also given by Johansen (1955). Most the finds in Finland have been made in an environment of the same kind or approaching it.

The habitat on Valtavaara hill in Kuusamo was quite different (cf. records 7 and 8). It was open and low spruce forest (mean height ca. 5 m; in Kuhmo again ca. 15 m) mixed with much birch and a few pines. It is situated at an altitude of ca. 400—450 m, not far from the timber line. This type of habitat is illustrated in fig. 5. The habitats at Vattuvaara, Kuusamo (record 9) and in Salla (11) are fairly similar to that described above. A characteristic of the localities in Kuusamo is the presence of steep rocky slopes in the immediate neighbourhood. In the Pechora area *Tarsiger* is said to prefer rocky slopes near river shores (TEPLOVA 1957), and in the vicinity of Krasnoyarsk in south-

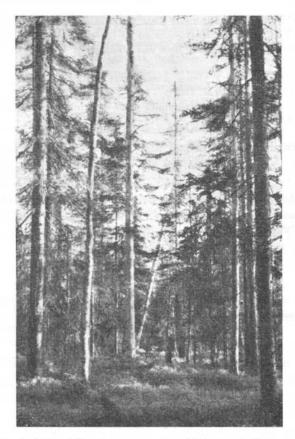


Fig. 4. The habitat of Tarsiger cyanurus at Välivaara in Kuhmo in 1953 (cf. record 3).

ern Siberia the species is reported to be common on steep mountain slopes with spruce and Siberian fir (Judin 1952). Probably the preferred nesting site is little crevices in rock faces.

Jahn (1942) has already drawn attention to the dualism in habitat selection of Tarsiger in Japan.

*Es ist auffällig wie verschiedenartigen Biotopen der Vogel vorkommt. In den tieferen Lagen sitzen die singenden Männchen auf den Spitzen über 20 m hoher Bäume und treiben sich darunter am Boden im tiefstem Waldeschatten herum, während sie in den höheren Zonen in niederen, lichterfüllten Birkenwald wohnen.»

In Finland the dualism in the selection of habitat is not so accentua-



Fig. 5. The habitat of Tarsiger cyanurus at Valtavaara in Kuusamo in 1954 (cf. records 7 and 8).

ted as in Japan, but here also the habitats of *Tarsiger* appear distinctly different to the human observer. It has been pointed out, however, that selection of habitats is a reaction in which purely optical external stimuli are involved (Svärdson 1949). Quite probably the *Tarsiger* male prefers a singing post with an open view. This feature is common to all the different habitats preferred (hill slopes, top of a tree taller than the average height of the surrounding forest, lake shores, edges of other open places). Steep rocks are apparently preferred because of nesting sites, too. Abundant decaying logs or dead standing trees might be of some importance regarding the food supply. Admittedly the summer food of *Tarsiger* is not well known, but according to Teplova (1957), who had 11 samples from Pechora, the most important items are beetles, their larvae and various caterpillars.

Summary.

From what has been said above, it seems probable that *Tarsiger cyanurus* already occurs fairly regularly in northeastern Finland, where the species evidently has the best chance to thrive. Since 1949, singing males have been recorded at least once a year. It is possible that the species has already bred in Finland.

The appearance of *Tarsiger* in Finland probably represents a phase of dispersal from the »Ural barrier» to Fennoscandia. There is some

evidence that warm springs have stimulated the spring migration of the species and caused its prolongation.

All 5 available records in western Europe seem to be of accidental character only and probably do not imply a migratory divide.

In Finland *Tarsiger* seems to occupy two rather different habitats (cf. figures 4 and 5). Features common to both are an open view at the singing post of the male and the abundance of decaying logs.

Where there is the greatest likelihood of finding Tarsiger is on the slopes of hills and in tall dense spruce forests in such vicinities.

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Selostus: Sinipyrstön esiintyminen Suomessa ja yleisiä huomioita lajin leviämisestä länteen.

Kartassa 1 osoittavat renkaat sinipyrstön löytöpaikkoja Suomessa 1949 — 1951 (SOVINEN 1952 a ja b). Mustat ympyrät osoittavat myöhempiä löytöpaikkoja (numerot viittavat havaintoihin tekstissä). Laji on siis vuodesta 1949 lähtien tavattu joka vuosi vähintään kerran maassamme. Kaikki yksilöt (ehkä havaintoa 1 lukuunottamatta) ovat olleet koiraita, osa näistä vanhoja. Vaikka naaraita ei ole havaittu, Eenee mahdollista, että laji on pesinyt maassamme.

Sinipyrstön läntisin todettu pesimäpaikka on Lapin rauhoitusalue Kuolassa, missä ammuttiin elokuussa 1937 koiras, naaras ja juuri pesästä lähtenyt poikanen (MALZEVSKIJ 1947). Uralin länsipuoleBa lajia tavataan säännöllisesti ainakin Arkangelin tienoilla ja Petshoran rauhoitusalueella. Lajin yleislevinneisyys on esitetty kartassa 2. Käytettävissä olevien tietojen perusteella lajin leviäminen Uralilta itä-Suomeen näyttää tapahtuneen nopeasti. Tiedot lajin esiintymisestä Neuvostoliiton euroopanpuoleisella alueella ovat siinä määrin niukkoja, että mitään täydeBistä kuvaa lajin leviämisestä ei voi muodostaa.

Sinipyrstö kuuluu STEGMANNin siperialaiseen faunatyyppiin. Sen piirissä se edustaa erityistä eteläsiperialaista ainesta, johon kuuluvat 13 tekstissä lueteltua lajia. Näistä sinipyrstö on ainoa joka on levinnyt Euroopan taigalle.

Uralin vuorijono näyttää muodostavan selvän leviämisesteen, jonka vaiheille useiden siperialaiseen faunaan kuuluvien lajien levinneisyyden länsirajat keskittyvät. Ne lajit, jotka ovat levinneet yli Uralin länteen, ovat kahta (Loxia leucoptera ja Cuculus saturatus) lukuunottamatta ulottaneet levinneisyysalueensa ainakin itä-Suomeen saakka. Myös sinipyrstön nykyinen leviäminen länteen näyttää osoittavan, että kun Urali on ylitetty, voi leviäminen jatkua nopeasti Fennoskandiaan saakka. Leviämistä helpottavat latitudinen suunta ja alueen yhtenäisyys.

Kuvassa 3 on esitetty touko- ja kesäkuun keskilämpötilojen keskiarvon vuosittainen vaihtelu 1921—1957 Kajaanissa. Hajanaisesta aineistosta huolimatta näyttää ilmeiseltä, että lämpimät keväät ovat stimuloineet myös sinipyrstön kevätmuuttoa ja johtaneet prolongaatioihin. Otaksuttavan populaatiopaineen syistä päälevinneisyysalueella ei ole tietoja.

Sinipyrstö on ainakin viidesti tavattu länsi- (ja etelä-)Euroopassa syysmarraskuussa. Nämä syysmuuton aikaiset harhautumiset lienevät täysin satunnaisia eivätkä ilmauksia muuton jakaantumisesta. Lajin talvehtimisalueet ovat kaakkois-Aasiassa ja muutto tapahtunee yksinomaan Mongolian kautta.

Sinipyrstö suosii maassamme kahta toisistaan verratta:n selvästi poikkeavaa maastotyyppiä. Kuvassa 4 on korkeata, tiheätä, kuusivaltaista metsää lajin löytöpaikalta Kuhmon Välivaarassa. Kuva 5 esittää esiintymisympäristöä Kuusamon Valtavaaralla (matalaa, harvaa kuusi-koivusekametsää lähellä puurajaa). Samankaltaisia eroja biotoopinvalinnassa on havaittu myös muualla (esim. Japanissa, vert. Jahn 1942). Yhteisiä piirteitä biotoopeille ovat avoin näköala koiraan laulupaikalla (esim. korkean puun latva tai rinteellä kasvava puu) ja lahoavien puiden tai kelojen runsaus, millä lienee merkitystä lähinnä ravinnonsaannin kannalta. Laji suosii myös kallioisten rinteiden läheisyyttä ilmeisesti pesäpaikkoja tarjoavien kallionkolojen vuoksi.