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BREEDING AND WINTER DISTRIBUTION OF ALPINE ACCENTOR (*Prunella collaris*) ON THE EASTERN COAST OF ADRIATIC SEA

*Gnjezdilišta i zimovališta alpskog popića (*Prunella collaris*) na istočnoj obali Jadrana*

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ABSTRACT

Alpine Accentor (*Prunella collaris*) is a scarce breeding species in the Northern and Southern Velebit, Dinara and Biokovo Mountains. Since 1986 the authors have observed the species on 22 occasions during the breeding period. Breeding was confirmed on Biokovo Mt., while on Velebit Mountain Alpine Accentor is regularly observed during the breeding season. According to the number of observed individuals, the population in Paklenica National Park is estimated at 10 breeding pairs, while the whole Croatian population is estimated to 160-210 pairs. Wintering of Alpine Accentor on the East Adriatic coast was confirmed by recent reports from Southern Velebit, along the southern border of Paklenica National Park and in Velika and Mala Paklenica canyons. Two observations from Biokovo Mt. in spring and autumn were documented, close to the breeding site, which are the only recent data of the Alpine Accentor for Central Dalmatia. There are only 14 known specimens of the species concerning other areas along the East Adriatic coast in Croatia (i.e. Istria, Kvarner Region, Central and Southern Dalmatia) and Montenegro in the collections of Natural History Museums in Zagreb, Split and Dubrovnik, dating from the 19th and 20th centuries. Recent observations from the aforementioned areas are unfortunately missing.

Keywords: Alpine Accentor, *Prunella collaris*, breeding distribution, winter distribution, East Adriatic coast, Croatia, Paklenica National Park.

INTRODUCTION

Alpine Accentor (*Prunella collaris*) is a breeding species of high altitude mountain grasslands of the southern parts of the Western Palearctic and a typical *Paleomontane faunal element* (VOOUS 1962, SNOW & PERRINS 1998); its breeding distribution extending from North-West Africa and Southern Europe across Central Asia to Japan and Taiwan (BIRDLIFE INTERNATIONAL 2015). In Europe the species inhabits the Pyrenees, Alps, Tatra, Dinarides and Carpathian Mountains from 1100 up to 2700 m a.s.l. (GLUTZ VON BLOTZHEIM & BAUER 2001). This species is resident, wanderer or it flies over short distances due to unfavourable conditions or high snow cover. Autumn migration lasts from late September to November. During migration it crosses distances of 10-20 km, but there are data on individuals that crossed as much as 390 and 480 km (GLUTZ VON BLOTZHEIM & BAUER 2001). While migrating to their wintering sites, they move in southwestern direction.

The subspecies that inhabits Dinarides along the Eastern Adriatic coast is *Prunella collaris subalpina* (BREHM, C.L., 1831), while the nominate subspecies (*P. collaris collaris*) is present in Slovenia (MATVEJEV 1976, SNOW & PERRINS 1998, GLUTZ VON BLOTZHEIM 2001). In Slovenia, according to GREGORI (1977), the species was recorded in the Julian and Caravan Alps eastwards to the Kamnik Alps with 850-2100 breeding pairs (BIRDLIFE INTERNATIONAL 2015). In Bosnia and Herzegovina, RUCNER & OBRATIL (1973) recorded this species on mountains Maglić, Volujak and Zelengora in *Pinus mugo* habitat.

Alpine Accentor is a breeding species of mountain habitats in Croatia. It was recorded as breeding species on Biokovo Mt. in the 19th century (KRALJ 1997). According to LUKAČ & KARADŽIĆ (1993), it was observed on Biokovo Mt., Northern and Southern Velebit Mt., as well as on Dinara Mt. in late 80's. Recent data about migration or wintering sites of this species in Croatia are missing. The total Croatian population is currently estimated at 50-100 pairs (BIRDLIFE INTERNATIONAL 2004), and its conservation status listed as Least Concern (LC) in the Croatian Red List (TUTIŠ *et al.* 2013).

MATERIALS AND METHODS

The data on distribution of Alpine Accentor presented in this paper have been collected during the field research in period 1986-2015, by reviewing the ornithological collection of the Museum of Dubrovnik and overview of literature references published in period 1887-2013 (Fig 1).

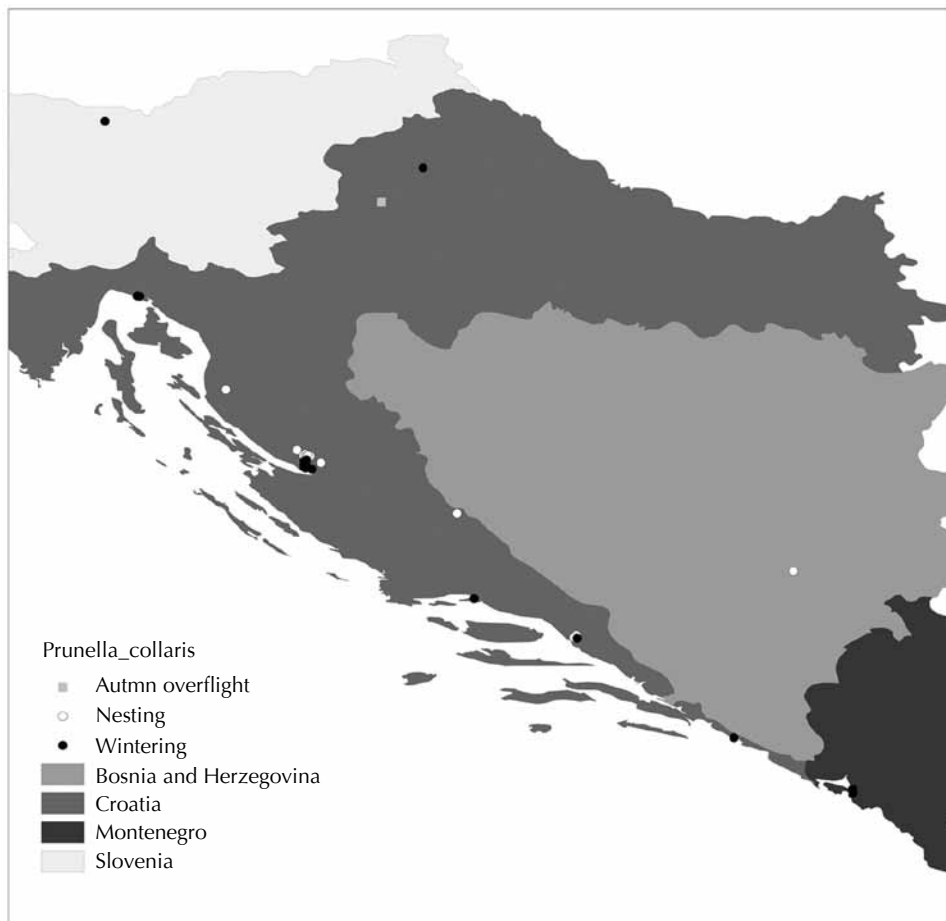


Figure 1. Observations of Alpine Accentor (*Prunella collaris*) in Slovenia, Bosnia and Herzegovina and on the east Adriatic coast, in Croatia and Montenegro.

Slika 1. Promatranja alpskog popiča (*Prunella collaris*) u Sloveniji, Bosni i Hercegovini i duž istočnojadranske obale, u Hrvatskoj i Crnoj Gori.

Field research

Field observations of Alpine Accentor during ornithological surveys in the Dinara, Biokovo and Northern Velebit Mts. concern the period 1986-1992 during which we had spent 30 days on the fieldwork during the breeding period. Exact period of the fieldwork was 28.4. – 23.7. Results of the fieldwork in Paklenica in period 1984-1995 are presented in LUKAČ & STIPČEVIĆ (1997). During the 1995-2015 period, field research of bird populations comprised the wider area of Paklenica National Park. During breeding season, we mapped 175 quadrants of the total surface 1x1 km. Mapping method covered 10% of the surface in 41 quadrants, 25% of 57 quadrants and 50 % of 77 quadrants, giving the total area of 54.8 km². Addition-

ally, 11 transects covering 145 ha were conducted on some habitat types, especially on subalpine meadows (LUKAČ 2011). Winter transect counts had been conducted in middle and lower altitude parts of the Park. In total, we have spent 2170 fieldwork days, and in migration and winter period we have spent 1040 fieldwork days.

Field research in Istria was conducted in the period 1987-2005. We have spent in total 2789 fieldwork days covering 52 UTM 10x10 km quadrants for preparation of bird atlas. We used a combination of line transect and mapping method.

Ornithological collections

Additional data have been derived from published catalogues of four bird skin collections: Institute of Ornithology, Croatian Academy of Arts and Sciences (Sušić *et al.* 1988), Croatian Natural History Museum in Zagreb (GRBAC & KRALJ 2008), Natural History Museum in Split (PIASEVOLI & PALLAORO 1991) and Natural History Museum in Dubrovnik (LUKAČ & BALTIĆ 2001).

Published observations

The overview of literature references published in period 1887-2013 is given. All available literature on Alpine Accentor observation sites was recorded along with published data from ornithological collections.

RESULTS

Slovenia

Two feeding specimens were recorded in Northwest Slovenia, above the Bled Lake, on December 30th 2012. Most probably they originated from the surrounding Julian Alps which were under snow cover at that time (G. LUKAČ & S. VUJČIĆ-KARLO).

Bosnia and Herzegovina

According to RUCNER & OBRATIL (1973), Alpine Accentor was observed on Maglić Mt. (2386 m a.s.l.), Volujak Mt. (2296 m a.s.l.) and Zelengora (2014 m a.s.l.) in *Pinus mugo* habitat. A female specimen collected on June 5th 1887 on Bjelašnica Mt. is kept at Croatian Natural History Museum (GRBAC & KRALJ 2008).

Croatia

For Istria, there are two records of Alpine Accentor from the 19th century. They were found in Buje in 1883 and are kept at the Museum of Trieste (SCHIAVUZZI 1887, SADINI 1960/61). Recent observations are missing.

For the Kvarner region there are five winter observations from Rijeka from the 19th century. They are kept at Croatian Natural History Museum (GRBAC & KRALJ

2008), and they probably originated from Alps. In the area of Hajdučki kukovi on Northern Velebit Mt., Alpine Accentor was observed on June 30th 1988 on rocky grassland between spruce (*Picea abies*) and juniper (*Juniperus communis* ssp. *alpina*) stands at 1350 m a.s.l. In Paklenica National Park, it has been observed during the breeding period in 9 quadrants (Fig. 2). It was recorded as a scarce breeding species on rocky, high altitude mountain grasslands with shrubs of junipers (*J. communis* ssp. *nana*, *J. sabina*) and pine (*Pinus mugo*). In Paklenica National Park

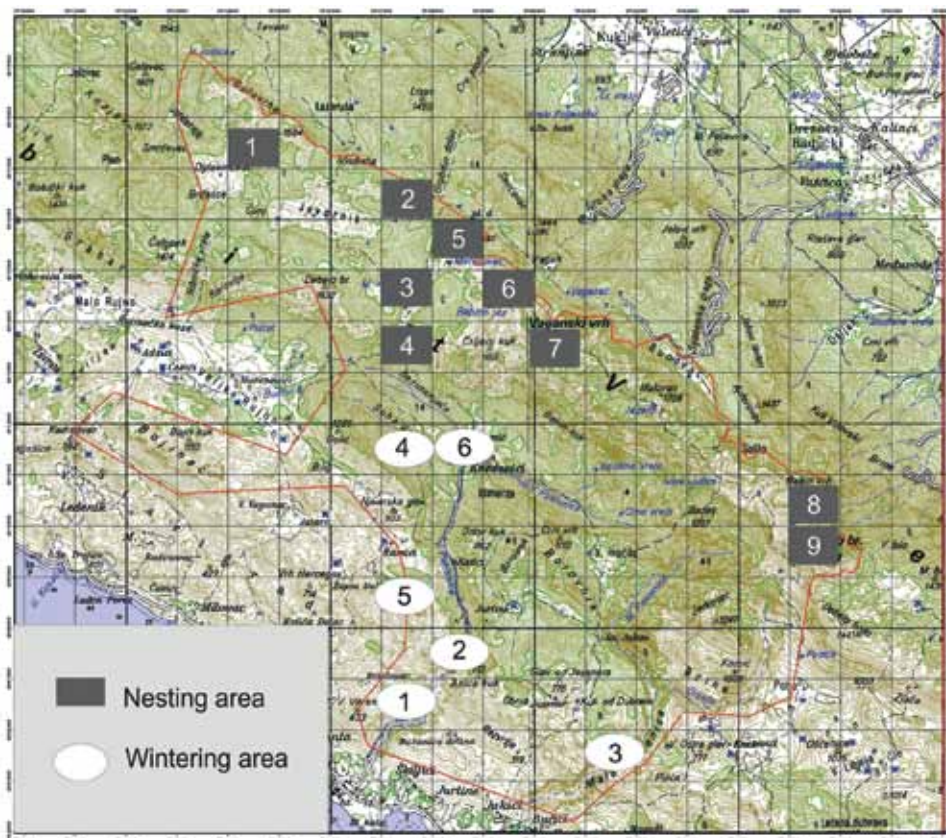


Figure 2. Breeding and wintering areas of Alpine Accentor (*Prunella collaris*) in Paklenica National Park.

Slika 2. Područje gniježđenja i zimovanja alpskog popića (*Prunella collaris*) u Nacionalnom parku Paklenica.

it was observed in the 14 km air distance stretch from Golovrhe to Sveto brdo. On Southern Velebit, this species is present on altitude from 1390 m a.s.l. to 1750 m a.s.l. In total, there are about 10 breeding pairs in wider area of Paklenica National Park (LUKAČ 2011).

In winter, we have observed Alpine Accentor on lower altitudes of the Paklenica NP, in Mala and Velika Paklenica canyons and on the middle altitudes of Paklenica NP between 50 and 850 m a.s.l. We recorded 11 winter observations in 6 1x1 km quadrants, 6 observations in autumn and 2 during spring migration. Several individuals have been observed in the altitude range of 50-850 m a.s.l. In Mala and Velika Paklenica canyons it was observed in the altitudes 50-300 m a.s.l. in the wintering period. On rocky grasslands above the Velika Paklenica canyon it was recorded on the altitude of 700 m a.s.l. in winter, and it was recorded on January 10th 2009, on 843 m a.s.l.

On Dinara Mt., Alpine Accentor was recorded above Uništa, on April 28th 1986 at 1500 m a.s.l. in mountain grasslands covered with patches of snow. Several individuals were observed from Sleme to Troglav in the 1800 m a.s.l. on June 28th 1986. They stayed near the snow patches. A pair of birds has been observed on the stretch from Gnjat to Torlakova glava in mountain grasslands between pine (*Pinus mugo*) stands. Altitude range of bird occurrence on Dinara Mt. is 1500-1900 m a.s.l.

On Biokovo Mt. the breeding of Alpine Accentor was confirmed on July 22nd 1988 (LUKAČ & KARADŽIĆ 1993). The birds nested in the grassland, not far from the road, about 150 m from Sv. Jure peak at 1700 m a.s.l. There were four young birds in the nest. On the same day, a flock of five birds was seen. The next day, on July 23rd 1988, two individuals were observed around the Motika peak (1600 m a.s.l.). The altitude range of summer observations on the Biokovo Mt. is 1600-1760 m a.s.l. On March 22nd 1991, two individuals were recorded on the highest peak of Biokovo Mt., Sv. Jure (1762 m a.s.l.) during spring migration. In autumn, on November 12th 2006, six individuals were recorded on the same location, on rocky grassland covered with remains of snow. The only known winter record was obtained from the collection of the Natural History Museum in Dubrovnik: one male individual was caught on Lopud on December 23rd 1898.

Montenegro

The data for winter observations have been gained from the collection at Croatian Natural History Museum in Zagreb for locations in Montenegro (Kosmač near Budva) dating from the 19th century, and it indicates vertical migration from Bosnia and Herzegovina or mountain areas of Montenegro to the east Adriatic coast.

DISCUSSION

On Velebit Mt., Alpine Accentor breeds between 1350-1750 m a.s.l. On Dinara Mt Alpine Accentor was observed on 1500-1900 m a.s.l. Altitude range of breeding sites on Biokovo Mt. was between 1600 and 1760 m a.s.l. (Fig. 3). Dur-

ing breeding period, birds were mostly observed on open, rocky grasslands surrounded by shrubs of junipers (*Juniperus sabina*, *Juniperus communis* ssp. *alpina*), spruce (*Picea abies*), or pine (*Pinus mugo*). The preference for the same vegetation type was recorded in Slovenia (MATVEJEV 1983).

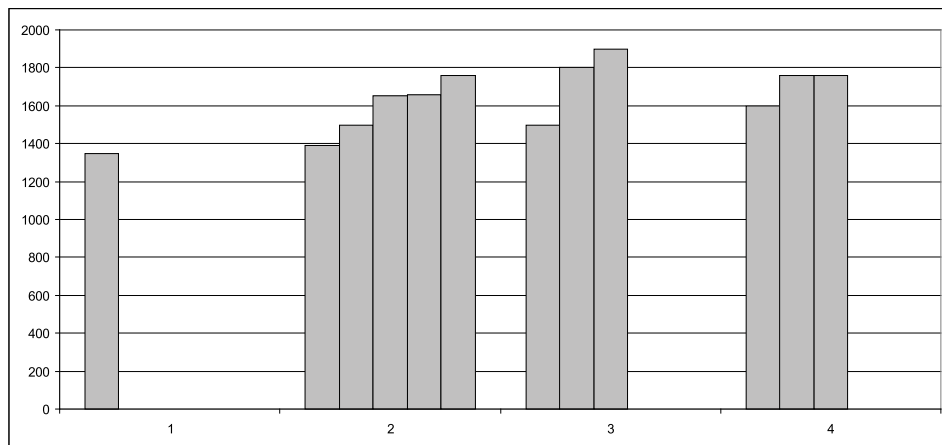


Figure 3. Altitude distribution of Alpine Accentor on 1- Northern Velebit, 2- Southern Velebit, 3- Dinara and 4- Biokovo during breeding season.

Slika 3. Visinska rasprostranjenost alpskog popića na Dinarskim planinama u Hrvatskoj tijekom razdoblja gniježdenja.

In the breeding period, Alpine Accentor has been recorded in 9 quadrants in Paklenica National Park. Observations from Northern Velebit indicate that Alpine Accentor most probably breeds in that area. If so, it is not abundant and it is considered a rare species. The data about irregular wintering of Alpine Accentor in Croatia were gained on slopes of Southern Velebit Mt., in Paklenica National Park (LUKAČ & STIPČEVIĆ 1997; LUKAČ 2011), based on 11 winter observations, 8 observations from spring and autumn migration, in 6 quadrants from 1985 to today. Birds stay in this area when there is no snow. We assume that individuals from high altitude parts of the mountain are wintering on aforementioned wintering sites, and they fly 1-7 km from their breeding to the wintering sites. That is a typical example of vertical migration. On Southern Velebit Mt., Alpine Accentor is wintering on habitats of rocky grasslands at 50-850 m a.s.l., (Fig. 4) rocks and boulders with different chasmophyte vegetation such as *Teucrium arduini*, *Cymbalaria muralis*, *Asplenium trichomanes*, *A. ceterach*, and shrubs of *Amelanchier ovalis*, *Cottinus coggygria*, *Quercus pubescens*, *Fraxinus ornus*, *Rhamnus intermedia*, *Frangula rupestris*.

Only two spring and autumn records from Biokovo Mt. indicate that the birds stay near their breeding sites if winter is warmer and with less snow, and if there is enough food on disposal. Wintering of the population breeding on the highest

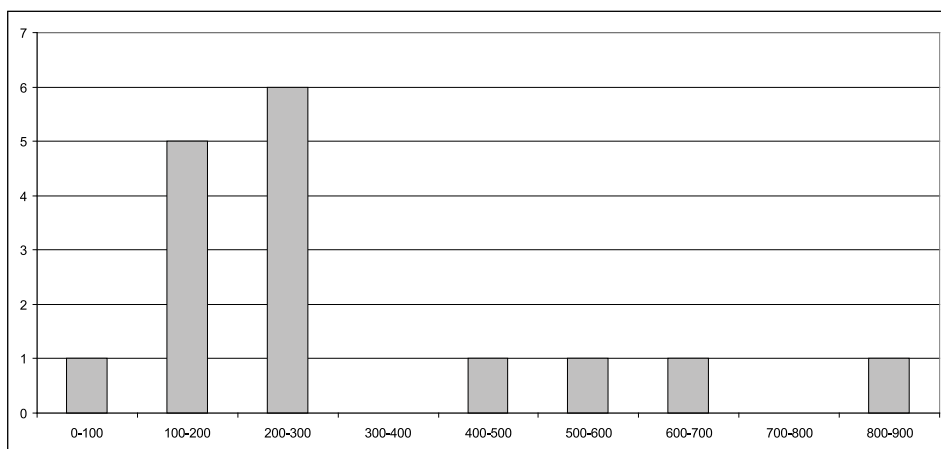


Figure 4. Winter observations of Alpine Accentor according height class at a.s.l. on Velebit and Biokovo (n= 16).

Slika 4. Nadmorska visina zimskih opažanja alpskog popića na Velebitu i Biokovu (n = 16).

peak of Biokovo Mt. is possible on lower slopes of the mountain, from Bast to Podgora, but unfortunately, there are no recent observations.

Population from Dinara Mt. most probably overwinters in lower parts without snow; the record of an individual on Kozjak near Split implies that is a possible wintering site (KRPAN 1960, 1980).

Overwintering individual found on the island of Lopud near Dubrovnik probably originated from the nearest high mountain grasslands of Bosnia and Herzegovina. The distance that birds cross in migration from the breeding to the wintering sites ranges between 20 and 50 km (GLUTZ VON BLOTZHEIM & BAUER 2001).

There are two interesting findings kept in the collection of Croatian Natural History Museum from inland Croatia: one from Medvedgrad on Medvednica Mt. from autumn 1896 (KRONEISL 1949) and one winter record from Trnovec, Hrvatsko zagorje, collected on February 29th 1948 (GRBAC & KRALJ 2008). These individuals might come from Tatra Mts., as it is known that during migration, birds may cross distances up to 400-500 km in southwestern direction (GLUTZ VON BLOTZHEIM & BAUER 2001). There is a similar example of finding of another mountain species, the Snow Finch *Montifringilla nivalis* (LUKAČ & VUJČIĆ-KARLO 1997), on Medvednica Mountain.

Only few winter records from the 19th and the 20th century, 13 in total, imply the existence of small wintering locations along the Adriatic coast from Istria to Montenegro, which possibly exist today, but due to lack of recent observations they could not be confirmed. According to the results of our study, we estimate the Croatian breeding population at 160-210 breeding pairs (Velebit 80-100, Dinara 50-60 and Biokovo 30-50 breeding pairs).

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SAŽETAK

Alpski popić je rijetka i malobrojna gnjezdarica Dinarida: sjevernog i južnog Velebita, Dinare i Biokova. U sezoni gniježđenja je zabilježen tijekom 22 terenska dana. Gnijezdo s mladima pronađeno je na Biokovu, nedaleko Sv. Jure, 22.07.1988., dok je redovito promatran u sezoni gniježđenja na sjevernom i južnom Velebitu te Dinari. Na temelju broja opaženih pjevajućih mužjaka u sezoni gniježđenja, u nacionalnom parku Paklenica gnijezdeća populacija procijenjena je na desetak parova. Populacija na dinarskom dijelu Hrvatske procijenjena na 160 do 210 parova. Tijekom zime je alpski popić malobrojna i neredovita zimovalica u nacionalnom parku Paklenica. Zadržava se na nižim nadmorskim visinama od 300-850 m, a promatrali smo je tijekom 11 dana. Pretpostavili smo da se u nižim dijelovima, uz istočnu jadransku obalu, za oštrijih zima zadržava populacija koja se gnijezdi na visokoplaninskim livadama na nadmorskim visinama od 1400-1750m. Udaljenost koju ptice prevaljuju pri ovoj vertikalnoj migraciji, prema našim opažanjima je od 1-7 km.

Prema 14 pohranjenih primjeraka ptica u ornitološkim zbirkama u Hrvatskoj, iz razdoblja 19. i 20. st., pretpostavili smo da bi uz istočnu obalu Jadrana mogla postojati povremena i neredovita zimovališta na Kvarneru, okolici i zaleđu Splita, na padinama Biokova, okolici Dubrovnika i u crnogorskom primorju, no na žalost nedostaju novija opažanja. Ptice koje se zadržavaju u ovim neredovitim zimovalištim dolaze vjerojatno iz Alpa (područje Kvarnera), Tatra (kontinentalni nalazi), vršnih dijelova južnog Velebita (zimovališta u NP Paklenica), Dinare (okolica i zaleđe Splita) i Biokova. U okolica Dubrovnika i Budve mogli bi zimovati primjerci s visokih planina Bosne i Hercegovine te Crne Gore.