

## **BIRD DIVERSITY AND ITS THREATS IN DIMITROVGRAD, EASTERN SERBIA\***

### *STANJE DIVERZITETA I PRETNJE PO DIVERZITET PTICA NA PODRUČJU DIMITROVGRADA, ISTOČNA SRBIJA*

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#### **Summary**

*Dimitrovgrad is a peripheral municipality in the Republic of Serbia with only little data about its bird diversity. This article indicates observed breeding and non-breeding bird species that were collected in a non-systematical manner over the past 10 years in this municipality. In total, 120 species were observed, out of which 96 are considered breeding. Given that the observations do not cover the whole area, Dimitrovgrad can be considered a bird hotspot for Serbia. This hotspot is currently threatened by land abandonment, rapid land-use changes by emerging EU-type farming and widespread corruption. Safeguarding the current biodiversity would include a slow and steady development that focuses on small-scale farming and nature-based tourism.*

**Keywords:** biodiversity, birds, Serbia, threats

#### **Kratak sadržaj**

*Dimitrovgrad je periferna opština u Republici Srbiji sa samo malo podataka o raznolikosti ptica. Ovaj članak ukazuje na uočene ptice gnjezdalice i ptice selice koje su nesistematski sakupljane u proteklih 10 godina u ovoj opštini. Ukupno je uočeno 119 vrsta, od kojih se 96 smatra gnjezdalicama. S obzirom da zapažanja ne pokrivaju celo područje opštine, Dimitrovgrad se može smatrati žarištem ptica za Srbiju. Ovoj žarišnoj tački trenutno preči napuštanje zemljišta, brze*

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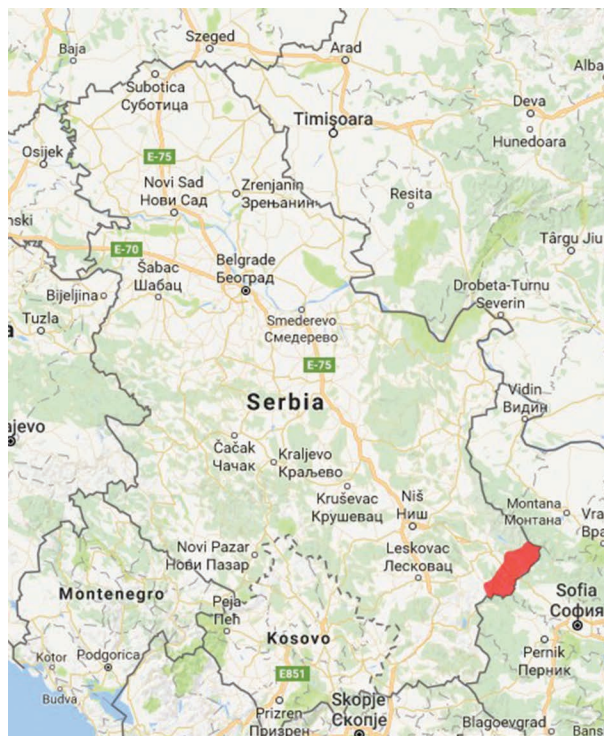
\*Invited lecture

*promene i upotreba zemljišta rastućim poljoprivrednim EU principima i široko rasprostranjena korupcija. Zaštita trenutne biološke raznolikosti uključivala bi spor i stalan razvoj koji se fokusira na malu poljoprivredu i turizam zasnovan na prirodi.*

**Ključne reči:** *biodiverzitet, pretnje, ptice, Srbija*

## 1. INTRODUCTION

Dimitrovgrad is the most Eastern municipality of the Republic of Serbia (Figure 1), holding a size of 483km<sup>2</sup>. Dimitrovgrad offers a high geological, geomorphological and ecological diversity resulting in a vast diversity of habitats within a relatively small area. Starting in the south, the calcareous parts of the Suva Mountains can be found featuring rough rocks, soft ridges and various plateaus. They are divided by the deep gorge of the Jerma River with its intact floodplains and wet riparian forests. Going towards north, the main valley follows, extending a few kilometres over flat fertile grounds that include the main settlements. Further north, the Stara Planina mountain range starts



**Figure 1.** Location of Dimitrovgrad (red) in Serbia. Source: [maps.google.com](https://maps.google.com)

with its first ridge that is followed by the plateau with the two Smilovci lakes and a considerable wetland area in the valley sink. Going further north leads over the next ridge into the highest plateau that is fairly remote and inhabited only by few people.

Dimitrovgrad has undergone pronounced depopulation processes since the 1950ies, in many rural villages of several 100 inhabitants in the past, less than 10 remain (SORS 2011). The depopulation stems from active governmental enforcement during communist times and from the desolate general state of the economy nowadays in Serbia (Lukic et al. 2012), which originates itself in political instability, an overly complicated bureaucracy, no access to finances and corruption (Milovanovic 2007, WEF 2015). Dimitrovgrad, as a peripheral region, is strongly affected by these unfavourable framework conditions. It is considered as an economically underdeveloped area suffering from very low average income and high unemployment rates (Tosic 2009). Besides a large administration, a considerable restaurant-related tourism relying on Bulgarian guests and some small and medium sized enterprises exist. Most of the agricultural activities in the region, however, are restricted to self-subsistence farming (Bogdanov 2007). This land-use type in combination with the general economic and social conditions in the region are determining the landscape characteristics and habitat types currently found in Dimitrovgrad: It offers a very diverse mosaic of small land parcels with varying land use and different stages of succession. This situation is the fundament of a very diverse bird biodiversity.

## **2. METHODS**

During the past 10 years, the author has been conducting bird observations during spring, summer, autumn and winter in Dimitrovgrad. The observations were not done in a systematic manner. Some observations are originating from several hours birding trips, others from coincidental observations during other activities. Not all the areas of the Municipality of Dimitrovgrad are covered equally: The highest mountain peaks are not covered at all, the forests are highly underrepresented. Most observations were done in the agricultural land which holds an enormous diversity and abundance of species compared to the author's place of origin (Switzerland), where most of these species are extinct. The following text describes the main landscape types and the birds observed within. There is no claim of completeness given the non-systematic procedure, however, it is meant to illustrate the species found and serve as a basis for comparisons for later investigations.

### 3. RESULTS

#### Prevalent landscape types and bird species

##### 3.1. Traditional agricultural landscapes

The farming activities in Dimitrovgrad are mostly low in their intensity and with a few exceptions restrained to small parcels. Since all households use the fields slightly differently and many fields are not used every year or are even undergoing succession after complete abandonment, the agricultural landscapes are composed of a rich mosaic of diverse habitats. These mosaics are different in their composition: In the plains and plateaus, they are crop dominated but interspersed with hedgerows, groves, ruderal areas and bushland (Type 1, Figure 2). In the centers of the larger valleys, there are considerable areas with wetlands, reeds and wet meadows (Type 2, Figure 3). Finally, in the more inclined areas, these landscapes are grassland-dominated but interspersed with hedgerows, ruderal areas, some crop acres, bushlands and forests (Type 3, Figure 4). These three types cannot be discerned in an absolute way since they are superposed, intermixed and occur themselves in different varieties. The differentiation was used here in order to further structure dominant land-use categories and the birds observed within.



**Figure 2.** Traditional, crop dominated agricultural landscape in Radejna.

In Type 1, a large variety of birds can be found that show decreasing world-wide trends (table 1). These species usually show considerable populations in Dimitrovgrad. Out of them, highlights such as *Perdix perdix*, *Crex crex* and *Emberiza hortulana* offer large populations. The populations of *Streptopelia turtur* and *Sylvia nisoria* are of outstanding densities, probably even for the European context. Some singular *Emberiza melanocephala* occur in the lowest parts of these areas. In some bush dominated, stony areas, where shrubs



encroach after land abandonment, *Poecile lugubris* can be observed. Type 2 offers additional habitats for *Saxicola rubetra* and *Acrocephalus palustris*. For Type 3, an interesting additional species is *Lanius minor*. Furtheron, *Buteo rufinus* has been identified several times in the surroundings of Izatovci, in spring and summer. The birds always showed the typical light whitish breast color while sitting and a light brown tail with whitish upperparts towards the rump.



**Figure 3.** Traditional agricultural landscape with a wetland in the valley sink, Vlakovija.



**Figure 4.** Traditional, grassland-dominated agricultural landscape between Smilovci and Mazgoš.

**Table 1.** Bird species observed in the traditional agricultural landscapes  
of Dimitrovgrad

English name	Latin name	international trend <sup>1</sup>
Barred Warbler	<i>Sylvia nisoria</i>	stable
Black-headed Bunting	<i>Emberiza melanocephala</i>	decreasing
Cirl Bunting	<i>Emberiza cirlus</i>	decreasing
Common Kestrel	<i>Falco tinnunculus</i>	decreasing
Common Nightingale	<i>Luscinia megarhynchos</i>	stable
Common Quail	<i>Coturnix coturnix</i>	decreasing
Common Stonechat	<i>Saxicola torquata</i>	stable
Common Whitethroat	<i>Sylvia communis</i>	increasing
Corn Bunting	<i>Emberiza calandra</i>	decreasing
Corn Crake	<i>Crex crex</i>	stable
Eurasian Hoopoe	<i>Upupa epops</i>	decreasing
Eurasian Linnet	<i>Carduelis cannabina</i>	decreasing
Eurasian Skylark	<i>Alauda arvensis</i>	decreasing
Eurasian Wryneck	<i>Jynx torquilla</i>	decreasing
European Bee-eater	<i>Merops apiaster</i>	stable
European Goldfinch	<i>Carduelis carduelis</i>	stable
European Green Woodpecker	<i>Picus viridis</i>	stable
<b>European Turtle Dove</b>	<b><i>Streptopelia turtur</i></b>	decreasing <sup>2</sup>
Grey Partridge	<i>Perdix perdix</i>	decreasing
Lesser Grey Shrike	<i>Lanius minor</i>	decreasing
Lesser Whitethroat	<i>Sylvia curruca</i>	stable
Little Owl	<i>Athene noctua</i>	stable
Long-legged Buzzard	<i>Buteo rufinus</i>	stable
Ortolan Bunting	<i>Emberiza hortulana</i>	decreasing
Red-backed Shrike	<i>Lanius collurio</i>	decreasing
Red-rumped Swallow	<i>Cecropis daurica</i>	stable
Sombre Tit	<i>Poecile lugubris</i>	unknown
Tree Pipit	<i>Anthus trivialis</i>	decreasing
Western Yellow Wagtail	<i>Motacilla flava</i>	decreasing
Whinchat	<i>Saxicola rubetra</i>	decreasing
Woodchat Shrike	<i>Lanius senator</i>	decreasing
Woodlark	<i>Lullula arborea</i>	stable
Yellowhammer	<i>Emberiza citrinella</i>	decreasing

### 3.2 Forests and Groves

The forests in the lower parts of Dimitrovgrad are mostly coppice forest stands dominated by various drought- and cut-resistant *Quercus*, *Carpinus*, *Tilia* and other species (Figure 5). Along the rivers, *Populus*, *Betula*, *Alnus* and other species form intact floodplain forests. In the higher and remote parts of Stara Planina, some *Fagus*- and *Picea*-forests remain. Some *Pinus*-plantations from the communist times are interspersed in these more natural forests. Besides fairly common species (table 2), two are noteworthy in the forests and groves: First, *Oriolus oriolus*, that can be observed in practically all groves in the lowlands, forming very high densities. Second, *Ciconia nigra*, of which an adult has been observed in summer 2011 in the Jerma Canyon, possibly indicating a breeding-site for Dimitrovgrad.

**Table 2.** Bird species observed in forests and groves of Dimitrovgrad

English name	Latin name	International trend
Black Stork	<i>Ciconia nigra</i>	unknown
Black Woodpecker	<i>Dryocopus martius</i>	stable
Common Chaffinch	<i>Fringilla coelebs</i>	stable
Common Chiffchaff	<i>Phylloscopus collybita</i>	increasing
Common Wood Pigeon	<i>Columba palumbus</i>	increasing
European Robin	<i>Erithacus rubecula</i>	increasing
Eurasian Bullfinch	<i>Pyrrhula pyrrhula</i>	decreasing
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	stable
Eurasian Jay	<i>Garrulus glandarius</i>	stable
Eurasian Nuthatch	<i>Sitta europaea</i>	stable
Eurasian Wren	<i>Troglodytes troglodytes</i>	increasing
Great Spotted Woodpecker	<i>Dendrocopos major</i>	increasing
Long-tailed Tit	<i>Aegithalos caudatus</i>	stable
Short-toed Treecreeper	<i>Certhia brachydactyla</i>	increasing
Song Thrush	<i>Turdus philomelos</i>	increasing
Spotted Flycatcher	<i>Muscicapa striata</i>	decreasing
Syrian Woodpecker	<i>Dendrocopos syriacus</i>	increasing



**Figure 5.** Drought-tolerant forests in coppice are covering large shares of Dimitrovgrad

### 3.3 Wetlands

Despite the low precipitation (ca. 650 mm/y) and hot temperatures in Summer, Dimitrovgrad holds creeks, rivers, lakes, wet meadows, fens and reeds (Figure 6). These areas are usually found in the sinks of the valleys and plateaus. The streams are in a quite natural state indicated by abundant *Motacilla cinerea* and *Alcedo atthis* such as in the Jerma area. The two artificial lakes of Simlovci are used for fishing, some of the fens in the surroundings are used for hay and litter production, the reeds are generally not used. The wetlands attract many migratory birds (see section 3.7) but also represent a small but very valuable habitat for breeding wetland birds such as *Ixobrychus minutus*. The rather small areas of these habitats keeps the number of breeding birds rather low (table 3). Despite this, it may be that *Circus aeruginosus* is breeding in the wetland area around Smilovci: Males or females were observed over several years during the summer months.



**Figure 6.** Wetland vegetation around the Smilovci Lakes in Dimitrovgrad



**Table 3.** Bird species observed in wetlands of Dimitrovgrad

English name	Latin name	International trend
Common Kingfisher	<i>Alcedo atthis</i>	unknown
Common Moorhen	<i>Gallinula chloropus</i>	stable
Common Reed Bunting	<i>Emberiza schoeniclus</i>	decreasing
Eurasian Coot	<i>Fulica atra</i>	decreasing
Eurasian Reed Warbler	<i>Acrocephalus scirpaceus</i>	stable
Great Crested Grebe	<i>Podiceps cristatus</i>	unknown
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	decreasing
Grey Heron	<i>Ardea cinerea</i>	unknown
Grey Wagtail	<i>Motacilla cinerea</i>	stable
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	decreasing
Little Bittern	<i>Ixobrychus minutus</i>	decreasing
Mallard	<i>Anas platyrhynchos</i>	decreasing
Marsh tit	<i>Poecile palustris</i>	decreasing
Marsh Warbler	<i>Acrocephalus palustris</i>	stable
Water rail	<i>Rallus aquaticus</i>	stable
Western Marsh Harrier	<i>Circus aeruginosus</i>	increasing
White Stork	<i>Ciconia ciconia</i>	increasing

### 3.4 Rocky landscapes

Both in the Suva and Stara Planina Mountains there are several cliffs and steep terrain with rocky areas. These areas can be interspersed with pastures and shrubland and offer habitats for a few specialized species (table 4), which include *Caprimulgus europaeus* or *Emberiza cia*, for example in the surroundings of Lukavica. *Aquila chrysaetos* nests in the surroundings of Greben Mountain while *Circus gallicus* was observed in the surroundings of Gradi-nje and Dimitrovgrad.

**Table 4.** Bird species observed in rocky landscapes of Dimitrovgrad

English name	Latin name	International trend
Eurasian Crag Martin	<i>Ptyonoprogne rupestris</i>	stable
European Nightjar	<i>Caprimulgus europaeus</i>	decreasing
Golden Eagle	<i>Aquila chrysaetos</i>	stable
Rock Bunting	<i>Emberiza cia</i>	increasing
Short-toed Snake Eagle	<i>Circus gallicus</i>	stable

### 3.5 Settlements

The settlements of Dimitrovgrad are diverse in their shape and state. In the remote villages, many houses are falling apart offering undisturbed breeding sites for swallows and martins (Figure 7). The city area of Dimitrovgrad has larger buildings and many family houses that also serve as breeding grounds. The swallows and martins are generally well accepted, their nests not removed. The high resulting breeding opportunities in the city and the villages together with the high insect abundances and commonness of dirt roads leads to enormous densities especially of *Delichon urbicum* which can form large flocks in late summer (Figure 8). On the unfinished building areas and inside of settlements, *Galerida cristata* is found too. Both of these species are strongly decreasing in Central Europe (table 5).



**Figure 7.** Village picture with traditional clay houses in Brajčevci, Dimitrovgrad



**Figure 8.** Late summer *Delichon urbicum* flock with more than 100 individuals in Kamenica

**Table 5.** Bird species observed in settlements of Dimitrovgrad

English name	Latin name	International trend
Barn Swallow	<i>Hirundo rustica</i>	decreasing
Common House Martin	<i>Delichon urbicum</i>	decreasing
Common Swift	<i>Apus apus</i>	stable
Crested Lark	<i>Galerida cristata</i>	decreasing
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	increasing

### 3.6 Other landscapes

The remaining observations were made in various other landscapes or include generalist bird species that can be found in various different habitats (table 6). The only noteworthy observation here is the high density of *Cuculus canorus* that benefits from the general high bird densities offering many breeding opportunities.

**Table 6.** Bird species observed in various landscape types of Dimitrovgrad

English name	Latin name	International trend
Black Redstart	<i>Phoenicurus ochruos</i>	increasing
Carrion Crow	<i>Corvus cornix</i>	increasing
Common Buzzard	<i>Buteo buteo</i>	stable
Common Cuckoo	<i>Cuculus canorus</i>	decreasing
Common Starling	<i>Sturnus vulgaris</i>	decreasing
Eurasian Blackbird	<i>Turdus merula</i>	stable
Eurasian Blackcap	<i>Sylvia atricapilla</i>	increasing
Eurasian Blue Tit	<i>Cyanistes caeruleus</i>	increasing
Eurasian Magpie	<i>Pica Pica</i>	stable
Eurasian Siskin	<i>Carduelis spinus</i>	stable
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	stable
Eurasian Tree Sparrow	<i>Passer montanus</i>	stable
European Greenfinch	<i>Carduelis chloris</i>	increasing
European Serin	<i>Serinus serinus</i>	decreasing
Great Tit	<i>Parus major</i>	increasing
House Sparrow	<i>Passer domesticus</i>	decreasing
Northern Raven	<i>Corvus corax</i>	increasing
Spanish Sparrow	<i>Passer hispaniolensis</i>	stable
White Wagtail	<i>Motacilla alba</i>	stable

### 3.7 Migratory birds

The wetlands and water bodies in the sinks of the mountain valleys offer feeding and resting sites for migrating birds in spring and autumn. The Smilovci lakes and the surrounding wetlands have been identified as a special hot-spot during migration seasons. Various wetland species including waders, herons, terns and gulls have been observed there during this time (table 7).

**Table 7.** Bird species observed during migration season in Dimitrovgrad

English name	Latin name	International trend
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	decreasing
Black-winged Stilt	<i>Himantopus himantopus</i>	increasing
Common Greenshank	<i>Tringa nebularia</i>	stable
Common Sandpiper	<i>Actitis hypoleucos</i>	decreasing
Common Snipe	<i>Gallinago gallinago</i>	decreasing
Great Grey Shrike	<i>Lanius excubitor</i>	stable
Green Sandpiper	<i>Tringa ochropus</i>	stable
Hawfinch	<i>Coccothraustes coccothraustes</i>	stable
Hen Harrier	<i>Circus cyaneus</i>	decreasing
Little Egret	<i>Egretta garzetta</i>	increasing
Little Gull	<i>Hydrocoloeus minutus</i>	increasing
Little Ringed Plover	<i>Charadrius dubius</i>	stable
Montagu's Harrier	<i>Circus pygargus</i>	decreasing
Northern Wheatear	<i>Oenanthe oenanthe</i>	decreasing
Osprey	<i>Pandion haliaetus</i>	increasing
Purple Heron	<i>Ardea purpurea</i>	decreasing
Pygmy Cormorant	<i>Phalacrocorax pygmeus</i>	increasing
Red-footed Falcon	<i>Falco vespertinus</i>	decreasing
Rough-legged Buzzard	<i>Buteo lagopus</i>	stable
Sedge warbler	<i>Acrocephalus schoenobaenus</i>	stable
Squacco Heron	<i>Ardeola ralloides</i>	decreasing
Tawny Pipit	<i>Anthus campestris</i>	stable
White-winged Tern	<i>Chlidonias leucopterus</i>	stable
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	decreasing

<sup>1</sup>The international trend is taken from IUCN: [www.iucnredlist.org](http://www.iucnredlist.org)

<sup>2</sup>*Streptopelia turtur* is the only breeding species listed in the international Red List; current status is vulnerable.

#### **4. DISCUSSION**

##### **Regional qualities and their threats**

During the 10 years, 120 bird species were observed in Dimitrovgrad out of which 96 are considered breeding species. In whole Serbia, the number of observed birds is 352 while 249 species are recorded to be breeding (Šćiban et al. 2015). Hence, these observations shown here indicate that Dimitrovgrad hosts around 40% of the breeding bird species of Serbia. Using a more systematic observation approach to cover more habitats would provoke further species to be observed. Given these aspects, it can be concluded that Dimitrovgrad represents a bird hotspot for Serbia.

The landscape, habitats and hence the bird diversity underwent certain changes in the past decades mostly related to land abandonment. Many former acres have been converted to grassland while grassland has been converted to shrub- and bushland. Many of these abandoned lands still hold conservation value but will ultimately turn into forests which would be detrimental for the currently observed high levels of biodiversity. Bringing back livestock to the villages would alleviate this problem but is very difficult to realize as farming and especially sheep herding have bad reputations (Gulan 2013). Many projects have been undertaken to reverse the trends of the past years, none of which have been successful in counteracting this multi-faceted problem. Hence, a first threat for the preservation of the current bird diversity is the abandonment of existing land-uses.

In the areas closer to the city, an inverse development has been observed: Some areas have been converted from the small mosaic to large, uniform areas on which fodder for cattle (corn, alfa-alfa, artificial grassland, etc.) is cultivated. These areas rely on high fertilizer inputs and are not integrated in the farm's nutrient circle, as some of these farmers are not acquainted with proper farming practices. The manure from cattle is sometimes not used but flows untreated into water bodies, e.g. into the lower Smilovci lake. Hence, a second threat to bird diversity results from unprofessional large scale EU-type farming with large cattle flocks.

Despite being aware of the manure-spill into the Smilovci lake, the responsables in the municipality of Dimitrovgrad do not react since years. Similar processes happen in the area of forestry where wood is cut despite a strict national protection status, in hunting, where illegal poaching of birds and other game species is observed but hardly anybody punished or in tourism infrastructure that is being built in strictly protected areas. A third strong threat to bird-diversity results from these processes of corruption that have



direct impacts on bird populations. Despite being problematic, corruption also prevented Dimitrovgrad from obtaining a flourishing economy. Hence, one can assume that corruption also had positive outcomes for bird-biodiversity so far.

For the long-term conservation of the currently still high bird-biodiversity, one main strategy is to initiate a positive development in farming combined with building up small and middle sized businesses in this field (dairies, butchers, etc.). Given that national and municipal policies do not contribute to reaching this goal (Pejanovic et al. 2013, Volk 2012), it requires guided bottom up approaches. These processes should be accompanied with strong educational activities in order to safeguard the landscape assets, i.e. the rich and diverse mosaic of habitats. These current landscape assets and the bird hotspot can also be used to attract nature-oriented tourists, an expanding business worldwide (Steven et al. 2015).

## **5. CONCLUSION**

Dimitrovgrad's bird biodiversity is impressive, and it is not strongly threatened, at least in the near future. However, corruption allows for unforeseeable large land-use changes that might put this diversity at risk. Over the longer term, succession in abandoned farmland leads to gradual and slow changes in habitats, ultimately also leading to biodiversity decline. Adopting a steady, well-grounded, bottom-up development trajectory with a main focus on farming and its related businesses would alleviate most problems and safeguard this bird hotspot in a sustainable way.

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