

Chewing Lice (Phthiraptera) Found on Songbirds (Passeriformes) in Turkey

Türkiye'deki Ötücü Kuşlarda (Passeriformes) Bulunan Çiğneyici Bit (Phthiraptera) Türleri

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ABSTRACT

Objective: This study was performed to detect chewing lice species found on the songbirds at Lake Kuyucuk bird ringing station in the Kars province located in eastern Turkey.

Methods: Chewing lice were collected from songbirds captured between September and October 2009. Fifty-one birds belonging to 22 species and 16 genera from 10 families were examined for the louse.

Results: Eleven of 51 birds (21.57%) belonging to 7 species; were infested with at least one chewing louse species. The collected lice were identified as *Menacanthus chrysophaeus* (Kellogg, 1896) on Reed Bunting, *Menacanthus pusillus* (Nitzsch, 1866) on Water Pipits, Calandra Lark and Yellow Wagtail, *Myrsidea rustica* (Giebel, 1874) on Swallow, *Brueelia cruciata* (Burmeister, 1838) on Red-backed Shrike, and *Penenirmus rarus* (Zlotorzycza, 1976) on Chiffchaff. All four Reed Bunting specimens were infested with *Menacanthus chrysophaeus*. The rate of infestation was 100% in Reed Bunting, Red-backed Shrike and Swallow; 66.7% in Yellow Wagtail; 50% in Calandra Lark and Chiffchaff and 11.1% in Water Pipits. No louse infestation was found in the birds belonging to Paridae, Passeridae, Sylviidae, and Muscipapidae families.

Conclusion: *Menacanthus chrysophaeus* on Reed Bunting and *Menacanthus pusillus* on Calandra Lark are new hosts for these lice species. All the louse species determined in the present study are first records for Turkey. (*Türkiye Parazitol Derg* 2011; 35: 34-9)

Key Words: Phthiraptera, chewing lice, Amblycera, Ischnocera, Turkey

Received: 26.08.2010

Accepted: 01.12.2010

ÖZET

Amaç: Bu çalışma Türkiye'nin Doğu Anadolu bölgesinde, Kars ili Kuyucuk Gölü Kuş Halkalama İstasyonu'nda yakalanan ötücü kuşlardaki bit türlerini belirlemek amacıyla yapıldı.

Yöntemler: Ötücü kuşlardaki çiğneyici bit örnekleri Eylül-Ekim 2009 tarihleri arasında toplandı. Bu amaçla 10 aile, 16 cins ve 22 türe ait 51 kuş bit yönünden incelendi.

Bulgular: İncelenen 51 kuştan yedi türe ait 11 tanesinin (%21.57) en azından bir bit türü ile enfeste olduğu tespit edildi. Bataklik Kirazkuşu (*Emberiza schoeniclus*)'dan *Menacanthus chrysophaeus* (Kellogg, 1896), Dağ İncirkuşu (*Anthus spinoletta*), Sarı Kuyruksallayan (*Motacilla flava*) ve Boğmaklı Toygar (*Melanocorypha calandra*)'dan *Menacanthus pusillus* (Nitzsch, 1866), Kirlangıç (*Hirundo rustica*)'dan *Myrsidea rustica* (Giebel, 1874), Kızılsırtlı Örümcekuşu (*Lanius collurio*)'dan *Brueelia cruciata* (Burmeister, 1838) ve Çıvgın (*Phylloscopus collybita*)'dan *Penenirmus rarus* (Zlotorzycza, 1976) olmak üzere beş tür saptandı. Bataklik Kirazkuşlarının hepsi *Menacanthus chrysophaeus* ile enfeste bulundu. Enfestasyon oranı, Bataklik Kirazkuşu, Kızılsırtlı Örümcekuşu ve Kirlangıç'ta %100, Sarı Kuyruksallayan'da %66,7, Boğmaklı Toygar ve Çıvgın'da %50, Dağ İncirkuşu'nda ise %11,1 olarak tespit edildi.

Sonuç: *Menacanthus pusillus*'a Boğmaklı Toygar'da, *M. chrysophaeus*'a ise Bataklik Kirazkuşu'nda ilk kez rastlanmış olup, her iki konak da bu türler için ilk kayıttır. Bu çalışmada tespit edilen bit türlerinin tamamı Türkiye faunası için yeni kayıtlardır. (*Türkiye Parazitol Derg* 2011; 35: 34-9)

Anahtar Sözcükler: Phthiraptera, çiğneyici bit, Amblycera, Ischnocera, Türkiye

Geliş Tarihi: 26.08.2010

Kabul Tarihi: 01.12.2010

This paper was presented as a poster presentation in the Fourth International Conference of Phthiraptera in June 13-18th in 2010, Ürgüp, Turkey

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doi:10.5152/tpd.2011.09

INTRODUCTION

Chewing lice (Phthiraptera: Amblycera, Ischnocera) are permanent obligate ectoparasites and are distributed worldwide throughout most bird families (1). The order Phthiraptera has nearly 5000 species in some 28 families (2), most of which have been reported from birds (1). Chewing lice living on feathers, such as ischnocerans, although causing damage to feathers, affect their hosts much less than do amblycerans (1).

In Turkey, 465 bird species are known (3), but the current knowledge on the louse fauna of birds in Turkey is quite incomplete. There is no comprehensive document about louse infestation on passeriform birds in Turkey. However, the availability of *Brueelia nebulosa*, *Myrsidea cucullaris* and *Sturnidoecus sturni* have been reported on starlings (4). The objective of this study was to investigate and identify louse species on passeriform birds in Turkey.

MATERIAL AND METHODS

Field work was carried out between September and October 2009 at Lake Kuyucuk Bird Ringing Station in Kars, eastern Turkey (43°27' N, 40°45' E). The Kuyucuk Lake Wildlife Reserve is one of the most important wetlands of eastern Turkey, where it is the only Ramsar wetland. It is also a "Key Biodiversity Area (KBA) and globally Important Bird Area (IBA)", located 37 kms north-east of Kars city centre, and 15 kms west of Akyaka town. Kuyucuk Lake is over 219 hectares and has an elevation of 1.627

meters. Surrounded by a treeless steppe and a few *Phragmites* reed patches, the surrounding vegetation is mostly removed by sheep and cattle. Kuyucuk Lake is the most important wetland in Kars for the birds. It hosts at least 214 bird species, some globally Endangered (White-headed Duck, Egyptian Vulture, Red-breasted Geese), and large raptor and waterfowl populations, sometimes exceeding 40,000 birds at one time. Fifty-one songbirds belonging to 22 species and 16 genera from 10 families were caught in mist nets, and ringed in the area during the field studies. All the captured birds were examined for ectoparasites, particularly for louse infestation, and then released unharmed (Table 1). In order to collect the lice, the feathers of each bird were carefully rubbed over a white piece of paper with a synthetic pyrethroid insecticide harmless to vertebrates. Then the birds were placed in breathable paper bags for 5 minutes. All lice were collected and placed in tubes with 70% alcohol. The louse specimens were cleaned in 10% KOH, mounted in Canada balsam on slides, and identified to species under a light-microscope (5-8).

RESULTS

Eleven of 51 birds (21.57%) belonging to seven species were infested with at least one chewing louse species. Five louse species in four genera were identified: *Menacanthus chrysophaeus* (Kellogg, 1896) (Figure 1) on reed bunting (*Emberiza schoeniclus*), *Menacanthus pusillus* (Nitzsch, 1866) (Figure 2) on yellow

Table 1. Studied bird families, genera and species

Bird Families	Bird Genera	Bird species	Number of bird
Alaudidae	<i>Melanocorypha</i>	<i>M. calandra</i>	2
Emberizidae	<i>Emberiza</i>	<i>E. schoeniclus</i>	4
	<i>Miliaria</i>	<i>M. calandra</i>	5
Hirundinidae	<i>Hirundo</i>	<i>H. rustica</i>	1
Laniidae	<i>Lanius</i>	<i>L. collurio</i>	1
Motacillidae	<i>Anthus</i>	<i>A. spinoletta</i>	9
	<i>Motacilla</i>	<i>M. citreola</i>	1
		<i>M. flava</i>	3
Muscipapidae	<i>Luscinia</i>	<i>L. svecica</i>	7
	<i>Phoenicurus</i>	<i>P. phoenicurus</i>	2
	<i>Saxicola</i>	<i>S. maura</i>	1
Paridae	<i>Parus</i>	<i>P. major</i>	1
Passeridae	<i>Passer</i>	<i>P. montanus</i>	1
Phylloscopidae	<i>Phylloscopus</i>	<i>P. collybita</i>	2
Sylviidae	<i>Acrocephalus</i>	<i>A. arundinaceus</i>	1
		<i>A. melanopogon</i>	3
		<i>A. palustris</i>	1
		<i>A. schoenobaenus</i>	1
	<i>Locustella</i>	<i>L. luscinioides</i>	1
	<i>Sylvia</i>	<i>S. atricapilla</i>	1
		<i>S. borin</i>	1
		<i>S. communis</i>	2

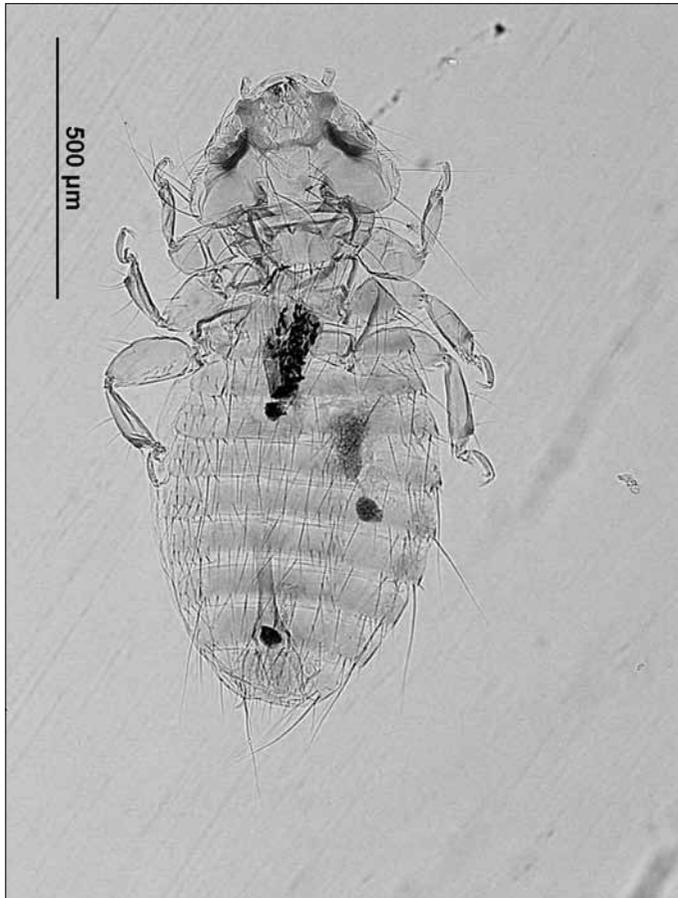


Figure 1. *Menacanthus chrysophaeus*, male, original

wagtail (*Motacilla flava*), calandra lark (*Melanocorypha calandra*) and water pipits (*Anthus spinoletta*), *Myrsidea rustica* (Giebel, 1874) (Figure 3) on swallow (*Hirundo rustica*), *Brueelia cruciata* (Burmeister, 1838) (Figure 4) on red-backed shrike (*Lanius collurio*), and *Penenirmus rarus* (Zlotorzycska, 1976) (Figure 5) on chiffchaff (*Phylloscopus collybita*). All specimens of reed bunting were infested with *M. chrysophaeus* (Table 3). The rate of infestation was 100% in red-backed shrike and Swallow; 66.66% in yellow wagtail; 50% in chiffchaff and 11.11% in water pipits (Table 2). No chewing lice were found on birds in Paridae, Passeridae, Sylviidae, and Muscipapidae families. Generally, the infested birds harboured a few lice. Minimum and maximum numbers of lice per infested bird were one and 33, respectively. All the louse species identified in the present study are the first records from Turkey. *Menacanthus chrysophaeus* on reed bunting and *Menacanthus pusillus* on calandra lark are new hosts for these lice species. All the louse species were identified in the present study are the first records for Turkey.

DISCUSSION

Lice comprise the only truly parasitic group amongst the exopterygote insects. Lice exhibit a remarkable level of host specificity, unequalled in most other metazoan parasites. As permanent, obligate ectoparasites, the distributions of lice have mostly paralleled those of their hosts (9). Consequently, lice are found on every continent and in most habitats occupied by birds and mammals. All orders and most families of birds have records of host-specific lice; of the few groups that do not, it is likely either that their lice are extinct or that the hosts have been searched insufficiently (9). Abiotic factors are known to influence the geo-

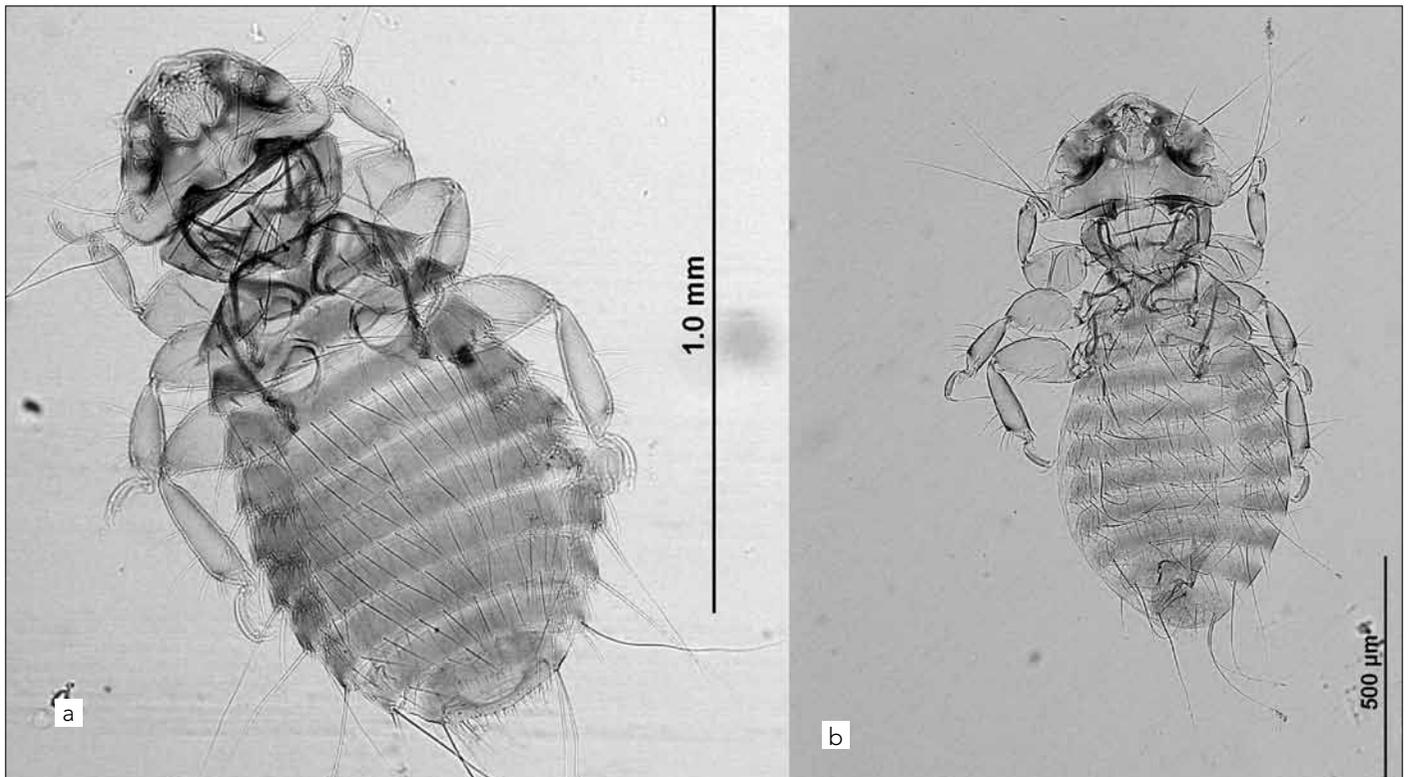


Figure 2. *Menacanthus pusillus*; a. female from *Motacilla flava* b. male from *Anthus spinoletta*, original



Figure 3. *Myrsidea rustica*, male, original



Figure 4. *Brueelia cruciata*, female, original

graphic distribution of lice (10). In a rapidly changing global environment, continuing study of the life patterns and harmonious relationships of two ecosystem partners, parasites and their hosts, established through long co-evolutionary processes, should offer a better understanding of the dynamics of parasite communities on host animals, including humans (11). Parasitic lice have medical and veterinary importance, and their successful transmission is possible by direct physical contact and phoresy between host individuals

Louse species such as *Brueelia blagovescenskyi* (Balat, 1955), *Philopterus residuus* (Zlotorzycska, 1964), and *Ricinus fringillae* (De Geer, 1778), were reported from reed bunting reed bunting (1), with *P. residuus* recently shown to be a new synonym of *P. citrinellae* (Schrank, 1776) by Palma and Price (12). Although *Philopterus citrinellae* (*P. residuus*) was reported from two reed buntings in the Northern Dobrogea of Romania (13), no *Philopterus* sp. was observed on the examined reed bunting in the present study. However, all examined reed buntings were observed to be infested with *Menacanthus chrysophaeus* (Kellogg, 1896) in the present study. *Menacanthus* spp. infestations were investigated comprehensively on Passeriformes birds (5-8, 14). Until today, *M. pusillus* has been reported from 6 *Anthus* species, including *A. spinoletta* as well *M. flava*, *M. alba* and *Pyrrhula* spp. (1). In the present study, one of the most common chewing lice species was *M. pusillus* detected on yellow wagtail, whereas *M. pusillus* were collected from water pipits and corn bunting. On the other hand, there has been no previ-



Figure 5. *Penenirmus rarus*, female, original

Table 2. Studied bird species and infestation rates

Bird species	Number of examined birds	Number of infested birds (%)
Corn Bunting (<i>Miliaria calandra</i>)	5	0 (0)
Tree Sparrow (<i>Passer montanus</i>)	1	0 (0)
Yellow Wagtail (<i>Motacilla flava</i>)	3	2 (66.66)
Citrine Wagtail (<i>Motacilla citreola</i>)	1	0 (0)
Water Pipits (<i>Anthus spinoletta</i>)	9	1 (11.11)
Red-backed Shrike (<i>Lanius collurio</i>)	1	1 (100)
Great Tit (<i>Parus major</i>)	1	0 (0)
Blackcap (<i>Sylvia atricapilla</i>)	1	0 (0)
Garden Warbler (<i>Sylvia borin</i>)	1	0 (0)
Whitethroat (<i>Sylvia communis</i>)	2	0 (0)
Great Reed Warbler (<i>Acrocephalus arrundinaceus</i>)	1	0 (0)
Moustached Warbler (<i>Acrocephalus melanopogon</i>)	3	0 (0)
Marsh Warbler (<i>Acrocephalus palustris</i>)	1	0 (0)
Sedge Warbler (<i>Acrocephalus schoenobaenus</i>)	1	0 (0)
Savi's Warbler (<i>Locustella luscinioides</i>)	1	0 (0)
Chiffchaff (<i>Phylloscopus collybita</i>)	2	1 (50)
Redstart (<i>Phoenicurus phoenicurus</i>)	2	0 (0)
Bluethroat (<i>Luscinia svecica</i>)	7	0 (0)
Siberian Stonechat (<i>Saxicola maura</i>)	1	0 (0)
Swallow (<i>Hirundo rustica</i>)	1	1 (100)
Calandra Lark (<i>Melanocorypha calandra</i>)	2	1 (50)
Total	51	11 (21.57)

Table 3. The distribution of lice collected on examined birds

Louse species	Bird species	Louse number			
		♀	♂	N	T
<i>Menacanthus pusillus</i>	<i>Anthus spinoletta</i>	1	1	-	2
	<i>Melanocorypha calandra</i>	17	1	18	36
	<i>Motacilla flava</i>	1	-	-	1
<i>Menacanthus chrysophaeus</i>	<i>Emberiza schoeniclus</i>	14	6	22	42
<i>Myrsidea rustica</i>	<i>Hirundo rustica</i>	1	-	1	2
<i>Brueelia cruciata</i>	<i>Lanius collurio</i>	2	-	-	2
<i>Penenirmus rarus</i>	<i>Phylloscopus collybita</i>	2	-	-	2

N: Nymph; T: Total

ous report of *Menacanthus* spp. infestation on reed buntings anywhere in the world. Many passerine louse species remain to be discovered in the developing world. For example, in Vietnam, 18 bird samples belonging to 6 genera out of 45 Passeriformes were found to be infested with chewing lice, and 7 louse species were identified on the examined birds. Six out of the 7 lice were found to be new species (15). According to some authors (5, 6), the genus *Menacanthus* has many species, is cosmopolitan, and its host specificity is very low. In parallel with the literature, *Menacanthus* specimens were observed more frequently, and *Menacanthus chrysophaeus* from reed bunting and *Menacanthus pusillus* from calandra lark were recorded from these hosts for the first time.

Similarly, the current knowledge of the louse fauna of birds in Turkey is quite incomplete. There is no comprehensive study on the louse infestation of Passeriformes birds in Turkey. However, *Brueelia* sp., *Brueelia nebulosa*, *Myrsidea cucullaris* and *Sturnidoecus sturni* has been reported on starlings (4). On the other hand, two house martins (*Delichon urbica*) and 13 sparrows (*Passer domesticus*) were examined for chewing lice, but no lice were found on any of the examined birds (16).

In the present study, eleven out of 51 birds (21.57%) belonging to 7 species were infested with at least one chewing louse species. The collected lice were identified as *Menacanthus chrysophaeus* on reed bunting, *Menacanthus pusillus* (Nitzsch, 1866) on water pipits, calandra lark and yellow wagtail, *Myrsidea rustica* (Giebel, 1874) on swallow, *Brueelia cruciata* (Burmeister, 1838) on red-backed shrike and *Penenirmus rarus* (Zlotorzycza, 1976) on chiffchaff. All reed bunting specimens were infested with *Menacanthus chrysophaeus*, whereas no chewing lice were found on the birds belonging to Paridae, Passeridae, Sylviidae and Muscipapidae families. However, it must be noted that no louse specimens have ever been collected from the moustached warbler, citrine wagtail and Siberian stonechat, which belong to these families (1) and on which we also found no lice.

In this study, more specimens of Amblycera were encountered. We found three species in two genera of Amblycera and two

species in two genera of Ischnocera. The intensity of louse infestations was highest in the bird species reed bunting and yellow wagtail. The examination of nine water pipits (*A.spinoletta*), seven bluethroat (*L.svecica*) and five corn bunting (*M.calandra*) resulted in the discovery of only two lice specimens on one *A.spinoletta*. On the other hand, all four reed bunting (*E.schoeniclus*) and two out of three yellow wagtail (*M.flava*) we examined were found to be infested with lice, and 42 and 36 louse specimens were collected from these species respectively. While waders (Charadriiformes) that were examined at the same station during the same period were found to have higher infestation rates (88% of all individuals) and 668 louse specimens were collected from 41 individuals (17), it is interesting that the infestation rate in passerines was four times lower (21.6%) and 87 were collected from 51 passerines. One likely reason for this is that the waders that were examined are larger than the passerines and hence, provide more living space for lice. The fact that waders are associated with water and tend to be more gregarious than the passerines examined may also have an influence, especially if the gregarious nature of the waders increases the likelihood of host-to-host transmission of lice. It is interesting to note that among the waders examined, the two species that had the highest louse infestation (reed bunting and yellow wagtail) are also associated with wetlands and are more social than the other passerines examined.

In conclusion, in this study, *Menacanthus chrysophaeus* on reed bunting and *Menacanthus pusillus* on calandra lark were recorded from these hosts for the first time. In addition, all the louse species that were identified are first records for Turkey. Because the current knowledge of the louse fauna of birds in Turkey is quite incomplete, it is highly possible that many new louse species will be discovered in future investigations. Phthiraptera comprise an important frontier of biodiversity research in Turkey.

Acknowledgments

We thank the Kuzey Doğu Society (www.kuzeydogu.org), Kuyucuk Bird Research and Education Center volunteers, Kuyucuk ringing station manager Sedat İnak, Emrah Çoban, and Önder Cırık for their help. We are grateful for the support of the Christensen Fund, the Conservation Leadership Programme, the Whitley Fund, and the Kafkas University Research Fund. We thank the Kars Directorate of Environment and Forestry and Turkey Directorate of Nature Conservation and National Parks (DKMPGM) for providing the research permits.

Conflict of Interest

No conflict of interest is declared by the authors.

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