

Ann. Naturhist. Mus. Wien, B	119	167–172	Wien, Jänner 2017
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## New records of *Carex* (Cyperaceae) for the flora of Armenia II

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### Abstract

*Carex remota*, a widespread species in Europe and Asia, was found for the first time in Armenia in June 2016. It was discovered at two sites in the S of the country. Its distribution and ecology are briefly discussed. Also some notes are given about a few rare Armenian *Carex* species, which were found during field trips in the last fourteen years.

**Key Words:** Flora of Armenia, *Carex*, *C. deasyi*, *C. depauperata*, *C. phyllostachys*, *C. remota*, *C. diluta* × *C. distans*.

### Kurzfassung

*Carex remota*, eine in Europa und Asien weit verbreitete Art, wurde das erste Mal für Armenien nachgewiesen. Sie wurde an zwei Stellen im Süden Armeniens gefunden. Die Verbreitung und ökologische Einordnung werden diskutiert. Weiterhin werden Ergänzungen zu einigen in Armenien seltenen *Carex*-Arten verzeichnet.

### Introduction

The Armenian *Carex* flora counts, according to KHANDJIAN (2001), 65 taxa, including four subspecies. KOOPMAN et al. (2015) could add to this number *Carex hartmanii* CAJANDER, while KOOPMAN et al. (2016) reported the first *Carex* hybrid for Armenia, *C. diluta* M. BIEB. × *C. distans* L. Meanwhile the genus *Kobresia* WILLD. is regarded as belonging to the genus *Carex* (GLOBAL CAREX GROUP 2015), so the three *Kobresia* species occurring in Armenia have been renamed as *Carex* (*Kobresia schoenoides* (C.A. MEY.) as *Carex deasyi* (C.B. CLARKE) O. YANO & S.R. ZHANG, *K. capillifolia* (DECNE.) C.B. CLARKE as *C. capillifolia* (DECNE.) S.R. ZHANG, and *K. persica* KÜK. & BORNM. as *C. alatauensis* S.R. ZHANG. The last species was not listed in Flora Armenii (KHANDJIAN 2001), but in The Red Book of Plants of the Republic of Armenia one locality is given (KHANDJIAN 2010).

During 2002–2012 several field trips were made to Armenia, a joint project of the herbaria ERE (Yerevan, Armenia) and W (Vienna, Austria). The main aim of the trips was

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to collect intensively from under-represented areas, which resulted in a better knowledge of the Flora of Armenia and several new findings for Armenia (VITEK et al. 2015). The first two authors revised the whole *Carex* collection of these field trips, and the *Carex* collection from Armenia in W and ERE in 2015–2016 and were able to find more recent collections of *C. hartmanii*, which occurrence in Armenia was hitherto restricted to one – (neglected) – collection from 1957 from the province of Lori (EGOROVA 2006) and two recent collections from the province of Aragatsotn (KOOPMAN et al. 2015).

A visit to Armenia in July 2015 resulted in the finding of the first *Carex* hybrid for the country, *C. diluta* × *C. distans*. Besides, the occurrence of *C. cilicica* BOISS. could be confirmed after fifty years and a new site with *C. hartmanii* was found, on the northern side of Selim pass, prov. Geghark'unik' (KOOPMAN et al. 2016).

In June 2016 an international botanical group trip was organised by the first author of this paper in order to collect more data about the Armenian flora. The group, consisting of 17 botanists from five countries (Austria, Netherlands, Poland, Portugal, USA), were guided by the Armenian botanists G. Fayvush, M. Oganessian and T. Alexanyan. Here we limit ourselves to discuss new results for some Carices.

## Results and Discussion

During the field trips in 2016 several interesting sites were visited, which resulted in some findings of new or, less common taxa. One *Carex* species has been found for the first time in Armenia: *C. remota* L. Some additional records were made of *C. deasyi*, *C. depauperata* CURTIS ex STOKES, *C. phyllostachys* C.A. MEY. and *C. diluta* × *C. distans*. As a total, currently there are 70 *Carex* taxa known in Armenia – including four subspecies – and one hybrid.

### *Carex remota* L. new for Armenia

*Carex remota* is a widespread species in Europe, N Africa and Asia. In Europe it is only not found in Iceland and on some Mediterranean islands. In all the remaining European countries it is often a common species at wet and shady places, like alongside streams in forests. From the Caucasus it is known from Georgia (GAGNIDZE 2005) and Azerbaijan (EGOROVA 1999), but hitherto it was missing in Armenia.

*Carex remota* was found on 16 June 2016 in the province Syunik, c. 19 km SSE of Kapan, E of the village Nerkin Hand, at an altitude of 660 m. There were at least three clumps growing in a *Platanus* forest, beside a small shaded stream. Later that day *C. remota* was found at a second site in the same province, Syunik, 17.5 km SSE of Kapan, along the road Kapan – Meghri, c. 1.1 km E of Tsav, at an altitude of 1070 m. Here it was growing at a humid place in *Quercus*- forest.

Although *C. remota* is, at least in most of the countries where it occurs, a common and commonly known species, it is hard to say why this species has never been found, collected, nor noted before in Armenia. The most plausible explanation seems to be that a great part of the country still needs further systematically botanical research, at least concerning the genus *Carex*.

Specimens: Armenia, province Syunik, area c. 19 km SSE Kapan, Nerkin Hand, *Platanus*-forest along river E of village, 660 m s.m., 39°03'40" N 46°31'50" E, 2016-06-16, Vitek,E., Koopman,J., Więclaw,H., Karl,R.,

Oganesian, M. & Fayvush, G. 16-0970 [W, ERE, herb. Koopman]; – Armenia, province Syunik', area 17.5 km SSE of Kapan, along road Kapan – Meghri, c. 1.1 km E of Tsav, 1070 m s.m., 39°03'15" N 46°28'10" E, 2016-06-16, Karl, R. 16-0979 [W, ERE, herb. Karl].

### Additional information about previously known *Carex* taxa in Armenia

#### *Carex deasyi* (C.B. CLARKE) O. YANO & S.R. ZHANG

This species, formerly called *Kobresia schoenoides*, was found at three sites between 2002–2012, once in the province Kotayk, NE of Yerevan (1978 m a.s.l.), and twice on Mt Aragats in Aragatsotn province, NW of Yerevan (3210 and 3410 m a.s.l.). In 2016 it was seen on Mt. Aragats, at an altitude of 3090 m, in alpine meadows, where the snow had just melted, together with young *C. tristis* M. BIEB.

Specimens: Armenia, Kotayk province, Kotayk district, Zovashen, below village, 1978 m s.m., 44°44'43" N 40°18'21" E, 2004-06-09. Fayvush, G. et al. 04-0268 [ERE, W 2006-0004826]; – Armenia, prov. Aragatsotn, Mt. Aragats, c. 12.5 km W of village Aragats, southern part of crater, 3210 m s.m., 40°29'24" N 44°12'03" E, 2008-06-28, Fayvush, G. et al. 08-1247 [ERE, W 2009-0015468, NY, PE]; – Armenia, Aragatsotn province, Mount Aragats, Naranaga ridge (leading south from the southern top), saddle E of Karilich, 3430 m s.m., 40°29'06" N 44°11'29" E, 2012-08-22, Vitek, E. et al. 12-0041 [ERE, W 2013-0011053].

#### *Carex depauperata* CURTIS ex STOKES

This species is rare in Armenia. Previously it had been collected only three times in the province Syunik and once in the province Tavush. It was not found during all the searches between 2002–2012 nor, during our botanical trip in 2015, when mainly the northern half of the country was visited. In 2016 it was found at three sites, all in the SE of Armenia. The first finding was at the same place as *C. remota*, in the *Platanus*-forest near the village Nerkin Hand, at an altitude of 660 m. Here it grows, among others, together with *C. phyllostachys*, *C. divulsa* STOKES and *C. sylvatica* HUDS. Later that day, 16 June 2016, it was also found at two more sites: at the same place as the second site of *C. remota* (see above), in a humid location in *Quercus*-forest, at an altitude of 1070 m, and a bit more to the north, at an altitude of 1106 m. At the latter site it was growing in a broad-leaved forest on a steep slope, rather dry, together with *C. halleriana* ASSO. These findings confirm the information given in the Red Book (KHANDJIAN 2010).

*Carex depauperata* occurs from southern Europe to C Asia (Koopman 2015). In most countries it appears to be rather rare. It is a species with a preference for rich and shaded forests, on slopes or along streams. Like many forest Carices it grows in clumps.

At first sight this species can easily be kept for some rigid material of *C. phyllostachys*. However, the utricles of *C. depauperata* are long beaked; besides the utricles have normally developed glumes, whereas *C. phyllostachys* has utricles without glumes but with very long bracts, up to 20 cm long, with the functionality of glumes. Finally, *C. depauperata* grows more upright and is much taller than the overhanging, fragile *C. phyllostachys*.

Specimens: Ноемберянский район, Дебедашенский леспром-хоз (Ламбалу), 1966-06-14, Barsegian, A.M. s.n. [ERE 0001902 (ERE-arm 84779)]; – Кафанский район, окрестности с. Н. Анд, берег реки Анд, дубово-грабовый лес., 1979-07-06, Gabrielian, E.Tz. s.n. [ERE 0001903 (ERE-arm 120822)]; – Кафанский район, Шикахохский заповедник, окрестности с. Цав, дорога к ущелью Мтнадзор, 1000 м над ур. м., 2000-06-05, Gabrielian, E.Tz. s.n. [ERE 0001908 (ERE-arm 185321)]; – Кафанский район, Шикахохский заповедник, окрестности с. Цав, дорога к ущелью Мтнадзор, 1000 м над ур. м.,

2000-06-05, Gabrielian, E. Tz. s.n. [ERE 0001907 (ERE-arm 185320)]; – Armenia, province Syunik', area c. 19 km SSE Kapan, Nerkin Hand, Platanus forest along river E of village, 660 m s.m., 39°03'40" N 46°31'50" E, 2016-06-16, Vitek, E., Koopman, J., Więclaw, H., Karl, R., Oganesian, M. & Fayvush, G. 16-0966 [ERE, W]; – Armenia, province Syunik', area 17.5 km SSE of Kapan, along road Kapan – Meghri, c. 1.1 km E Tsav, 1070 m s.m., 39°03'15" N 46°28'10" E, 2016-06-16, Karl, R. 16-0978 [ERE, W, herb. Karl]; – Armenia, province Syunik', area 17.5 km SSE of Kapan, along road Kapan – Meghri, c. 1.1 km E Tsav, 1106 m s.m., 39°03'19" N 46°28'25" E, 2016-06-16, Koopman, J. [Herb. Koopman].

### *Carex phyllostachys* C.A. MEY.

During the field trips in 2002-2012 this rare species was found once, in 2005, in the southern province Syunik, W of the main road Kapan-Goris, along the road to Kurdbulakh, c. 1 km from the main road, at an altitude of 1285 m. In 2016 it was found at three sites, all in the SE of Armenia, in the province Syunik. The first site was ca. 9 km SE of Kapan, along the road between Chakaten and Shikahogh, at an altitude of 980 m. It was found over there in a shaded broad-leaved forest (mainly *Quercus*), on steep slopes along a small rivulet, where it grows together with, among others, *C. pendula* HUDS., *C. divulsa* and *C. sylvatica*. The second site was at the same place as the first new site of *C. remota* (see above) in the *Platanus*-forest, where it grows together with *C. remota*, *C. divulsa*, *C. sylvatica* and *C. depauperata*, at an altitude of 660 m. The third site was at the same place as the second site of *C. remota*, 17.5 km SSE of Kapan, along the road Kapan – Meghri, c. 1.1 km E Tsav, at an altitude of 1070 m, at a humid place in *Quercus*-forest.

In the Red Data Book of Armenia (KHANDJIAN 2010) *C. phyllostachys* is mentioned from three sites in Armenia, scattered throughout the country: one in the NE (Iljevan, province Tavush), one in the SE (surroundings of villages Tsav and Vachagen, province Syunik) and one in the SW (Meghri: Vahravar river valley, province Syunik). In herbarium ERE is an additional specimen of Nerkin Hand, collected in 1986.

*Carex phyllostachys* is surely a rare species for Armenia. The recent collections confirm the known areas SE of Kapan and add a new locality further north of Kapan near Nor Arajadzor (formerly named Kurdbulakh). But it may be found at more places, at least in the SE part of the country, in dark and shaded forest, preferably (on slopes) along streams or at other wet places.

*Carex phyllostachys* is worldwide only known from eleven countries in S Europe and nearby Asia. For a long time in Europe it was only known to be in Macedonia (CHATER 1980). Later it was also found in Greece (AUTHIER 1997), Albania (BARINA & PIFKÓ 2011) and Italy (WAGENSOMMER et al. 2014). In the Caucasus it is known in all three Transcaucasian countries, Armenia, Azerbaijan and Georgia, as well as in the Northern Caucasus (Russia; EGOROVA 1999). NILSSON (1985) mentions it for Turkey, AUTHIER (1997) for Syria. In the Flora Iranica (KUKKONEN 1998) it is also mentioned for N Iran, from several places. Amini Rad has collected this species from at least 15 places in N Iran (pers. comm. M. Amini Rad, Tehran, Iran).

Specimens: Дебедашенский леспромхоз, Садахлинское лесничество, урочище Мушуд., 1967-06-15, Barsegian, A. s.n. [ERE 0001633 (ERE-arm 88024)]; – Armenia, Sjunik province, W of the main road Kapan – Goris, road to Kurdkulakh [corr. Kurdbulakh], c. 1 km from the main road, 39°20'24" N 46°26'12" E, 2005-05-02, Fayvush, G. et al. 05-0593 [ERE, W 2008-0004647, LI]; – Кафанский район, с. Цав, г. Навс, 1900 м., дубово-грабовый лес, восточный склон., 1979-07-04, Gabrielian, E. Tz. s.n. [ERE 0001638 (ERE-arm 133512)]; – Зангезур, Кафнский район, близ сел. Вачаган., 1958-05-08, Elenevski & Egorova, T. s.n. [ERE 0002673 (ERE-arm 78270)]; – Armenia, province Syunik, area c. 9 km SE Kapan, road

between Chakaten and Shikahogh, 980 m s.m., 39°08'28" N 46°27'50" E, 2016-06-16, Vitek,E., Koopman,J., Więclaw,H., Karl,R., Oganessian,M. & Fayvush,G. 16-0941 [ERE, W]; – Кафанский район, с. Неркин Анд, платановая роша, правый борт реки Цав., 1986-06-24, Chandjian,N. s.n. [ERE 0001636 (ERE-arm 133515), ERE 0001635 (ERE-arm 133513), ERE 0001634 (ERE-arm 133514)]; – Armenia, province Syunik, area c. 19 km SSE Kapan, Nerkin Hand, *Platanus*-forest along river E of village, 660 m s.m., 39°03'40" N 46°31'50" E, 2016-06-16, Vitek,E., Koopman,J., Więclaw,H., Karl,R., Oganessian,M. & Fayvush,G. 16-0967 [ERE, W]; – Мегринский район, долина реки Вагравар-чай ( правый приток р. Мегригет), выше пос. Вагравар. В дубовом лесу по склонам, ср. горн. пояс., 1956-07-01, Egorova,T. et al. 1575 [ERE 0001637 (ERE-arm 64924)].

### ***Carex diluta* M. ВИБ. × *C. distans* L.**

Hitherto only one *Carex* hybrid has been found in Armenia, *C. diluta* × *C. distans*, although there are currently 70 *Carex* taxa known to be in this country (KOOPMAN et al. 2016). It was found in 2015 in the province of Gegharkunik, at the NE-side of lake Sevan, in a gorge NE of the village Pambak, at an altitude of 2045 m, where it grows together with both its parents. On 14 June 2016 this hybrid was found at a second site: in the province Vayots Dzor, in the valley of the river Yeghegis, beside the road, along a small stream, 0.6 km WWSW of the village Hermon, at an altitude of 1700 m. It was accompanied by its parent *C. diluta*, while the other parent, *C. distans*, was missing here. Probably, this hybrid could be found at more places in Armenia, particularly where both parents grow together along small streams.

Specimens: Armenia, province Vayots' Dzor, valley of river Yeghegis, along road, 0.6 km WWSW of Hermon, 1700 m s.m., 39°52'34" N 45°25'22" E, water ditch along road, 2016-06-14 [herb. Koopman, herb. Karl].

### **Acknowledgements**

We thank Dr M. Amini Rad (Tehran, Iran) for providing us with information about *C. phyllostachys* in Iran.

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Zeitschrift/Journal: [Annalen des Naturhistorischen Museums in Wien](#)

Jahr/Year: 2017

Band/Volume: [119B](#)

Autor(en)/Author(s): Koopman Jacob, Wieclaw Helena, Karl Rainer, Fayvush George, Ogenesian Marina, Vitek Ernst

Artikel/Article: [New records of Carex \(Cyperaceae\) for the flora of Armenia II 167-172](#)