

The section *Ammoglochin* Dum. (*Carex*, Cyperaceae) in the Netherlands

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De sectie *Ammoglochin* Dum. (*Carex*, Cyperaceae) in Nederland

Al het materiaal van de sectie *Ammoglochin* in het herbarium van Naturalis Biodiversity Center te Leiden (L), in totaal 1068 collecties, is gerevideerd om zo een beter begrip en een completer beeld van het voorkomen van de vijf inheemse soorten van deze sectie in Nederland te krijgen. Een sleutel is toegevoegd om (Nederlandse) planten van deze sectie te kunnen determineren.

The section *Ammoglochin* Dum. (*Carex*, Cyperaceae) in the Netherlands

All the material of the section *Ammoglochin* that is kept in the herbarium of Naturalis Biodiversity Center in Leiden (L), in total 1068 collections, has been revised in order to get a better understanding and more complete overview of the occurrence of the five native species of this section in the Netherlands. A key is provided for the identification of (Dutch) plants belonging to this section.

Introduction

According to Van der Meijden¹, the Dutch *Carex* flora includes 59 native species. His list includes one species, *C. limosa* L., which has become extinct in the Netherlands, and two introduced and established species, i.e. *C. crawfordii* Fernald and *C. vulpinoidea* Michx. Recently, Weeda et al.² have added *C. davalliana* Sm. to the list. Hence, the Dutch *Carex* flora includes now 62 species, since the two subspecies of *C. oederi* Retz. are nowadays regarded as species, respectively *C. demissa* Hornem. (*C. oederi* subsp. *oedocarpa* Andersson) and *C. viridula* Michx. (*C. oederi* subsp. *oederi*), while *C. divulsa* Stokes s.l. has been split up into *C. divulsa* Stokes s.str. and *C. leersii* F.W.Schultz.³

In Europe seven *Carex* species belong to the section *Ammoglochin* Dum.: *C. arenaria* L., *C. brizoides* L., *C. colchica* J.Gay (in Van der Meijden¹ as *C. ligerica* J.Gay), *C. curvata* Knaf, *C. praecox* Schreber, *C. pseudobrizoides* Clavaud (in Van

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der Meijden¹ as *C. reichenbachii* Bonnet) and *C. repens* Bellardi. Of these seven species *C. curvata* and *C. repens* have never been found in the Netherlands. Of the five native species, only *C. arenaria* is common across the Netherlands, the other four are more or less rare.

Some authors also include *Carex disticha* Huds. in section *Ammoglochin*^{4 5}, while other authors, e.g. Egorova⁶, classify *C. disticha* in *Carex* section *Holarrhenae* (Döll) Pax, which is followed here.

In his first three editions Heukels' Flora van Nederland, Van der Meijden considered it impossible to distinguish *C. colchica* and *C. pseudobrizoides* from *C. arenaria*, and included them in the latter.^{7 8 9} However, in his next edition of the Heukels' Flora, Van der Meijden treated these three taxa as separate species, unfortunately without giving any further explanation.¹

As a consequence of merging *Carex colchica* and *C. pseudobrizoides* with *C. arenaria*, for 22 years the occurrence in the Netherlands of the former two species had been obscured. The fact that *C. colchica* and *C. pseudobrizoides* are rare in the Netherlands, and hence are rarely found and poorly known, did not help to overcome this situation. To get a better understanding of these two species as well as of the other species of section *Ammoglochin* in the Netherlands, the authors examined all specimens of this section that are kept in the herbarium of Naturalis Biodiversity Center in Leiden (L), which comprises a total of 1068 collections. Their results and findings are presented below.

***Carex arenaria* L.**

There are 628 collections of *Carex arenaria* in L (Table 1), which represents 59% of the specimens examined. Of these 628 collections, 596 (95%) have been correctly labelled, including 49 with a 'forma' designation. These forms are taxonomically insignificant. Twelve collections were initially identified as *C. colchica*, six as *C. pseudobrizoides*, three as *C. disticha*, two as *C. leporina* L., three as *C. spicata* Huds. (two of them with the old name *C. muricata* L.), one as *C. flacca* Schreb. (as *C. glauca* Scop.), and one as *Scirpus compressus* (L.) Pers. (= *Blysmus compressus* (L.) Panz. ex Link). One collection was labelled '*Carex* or *Juncus*?' and three specimens were unidentified.

Carex arenaria is within the section *Ammoglochin* the most common species in the Netherlands. The oldest dated material is from 1815, and is a collection made by D.C. Coster near de Bildt, in the Province of Utrecht. Unfortunately, many old collections lack good label information. There are 65 collections of *C. arenaria* without any date, but they were all made by collectors from the nineteenth century.

Carex arenaria has been collected almost all over the country and occurs in all provinces. In the up to date distribution map¹⁰ it is shown that *C. arenaria* is a common species in the Netherlands, but it does not occur in the sea clay areas in the northern Provinces of Friesland and Groningen. *Carex arenaria* is above all a species of coastal sites, where it often forms the vegetation in dry dunes. Inland the species occurs on the Pleistocene sand soils, e.g. on dry moorland, in dry *Pinus* forests on sand, and in sand dunes.¹ Of all five species of section *Ammoglochin*, it is the latest species to bloom. Ripe material can be found at least until late July.

Table 1. Numbers (n) of specimens in the herbarium of Naturalis Biodiversity Center in Leiden (L), and their corresponding percentages (%), of all five *Carex* species of section *Ammoglochin* Dum. native to the Netherlands. The abbreviation ‘n correct’ denotes the number of correctly identified specimens.

Species	n	%	n correct	%
<i>Carex arenaria</i>	628	59	596	95
<i>Carex brizoides</i>	68	6	65	96
<i>Carex colchica</i>	198	19	129	65
<i>Carex praecox</i>	63	6	60	95
<i>Carex pseudobrizoides</i>	111	10	78	70
Total	1068	100	928	87

Carex brizoides L.

There are 68 collections of *Carex brizoides* in L from the Netherlands (Table 1). The identification of these Dutch collections caused hardly any problems for the collectors (96% correctly identified); only three collections were initially made under another name, i.e. *Carex arenaria*, *C. colchica* (as *C. ligerica*), and *C. pseudobrizoides* (as *C. reichenbachii*).

Two other collections initially made under the name of *C. brizoides* were collected by H.J. Kok Ankersmit at Fort Apeldoorn (Province of Gelderland) in 1880. From one of these, the collection with barcode number L.3114178, the material is missing and its sheet contains only a label with a very faint text, which suggests that the material belonged to *Carex leporina* L. × *C. remota* L. The sheet of the other collection (L.3114159) contains a single plant with three flowering shoots, of which the most right one has an inflorescence with the typical pale colour of *C. brizoides*, those of the other two are tinted brown, a colour that does practically not occur in *C. brizoides*. Both collections were identified by J.D. Kobus as *C. brizoides*. This species is included in Kok Ankersmit’s list of plants from the municipality of Apeldoorn, published in 1879, where *C. brizoides* has been described as being “very common” there – remarkably, *C. arenaria* is completely absent from Kok Ankersmit’s list.¹¹ However, according to Kern & Reichgelt¹², Kok Ankersmit’s plant from Apeldoorn in L actually belongs to *C. leporina* (as *C. ovalis* Gooden), which we agree with.

Almost half of the 68 collections of *Carex brizoides*, i.e. 32 collections gathered during 1896–1984, were made at the Dutch ‘locus classicus’ near Vaals (Province of Limburg). Goethart collected this species there for the first time, in 1896, “aan de kanten van waterloopen in een vochtig weiland” [along water streams in a wet meadow] (L.3114169). The species is still growing abundantly at this site near Vaals (own observation).

A collection of *Carex brizoides* from Kerbert's herbarium (L.3114172) is of an older date. Unfortunately, the information about the locality and date of collecting are missing. In his overview of the Dutch Carices, for which he studied all Carices in the herbarium of the Nederlandsche Botanische Vereeniging [Dutch Botanical Society], now in L, Kobus¹³ wrote: "Ten eerste waren er vele goede exemplaren van goed gedetermineerde planten in het Herbarium aanwezig, zonder opgave van groeiplaats, vooral in het Herbarium Kerbert is het dikwijls het geval; zulke planten kunnen alleen als vergelijkingsmateriaal dienst doen." [Firstly, many good specimens of well-determined plants are present in the Herbarium without specifying a locality, in particular, this is often the case in Kerbert's Herbarium; such plants can only be used as material for comparison].

Weeda¹⁴ reported a collection of *Carex brizoides* made in 1870 at the Meerssenerberg, Province of Limburg, as the first find of this species in the Netherlands based on Goethart in Vuyck.¹⁵ However, since there is no herbarium material from this location in L, Weeda accepted as first record of collecting 1899 at the 'classic' locality, which year has to be corrected to 1896.

Until 1956, the site near Vaals was the only one in the Netherlands where material of *Carex brizoides* had been collected that is preserved in L. In 1956, E.E. van der Voo discovered a population along the Opweg near Stolwijk, Province of Zuid-Holland. Initially, the determination caused some problems, as among the six collections made there, all from 1956, two were erroneously named *C. colchica* and *C. pseudobrizoides*.

Of all 1068 collections examined, only 68 (6%) belong to *Carex brizoides* (Table 1). This species, therefore, seems to be rare in the Netherlands. The species shows, however, a wider distribution in the Netherlands than *C. praecox*, which is approximately equally abundant with 6% of all collections examined as well.¹⁰

The last few decades, *Carex brizoides* is getting more and more common in the Netherlands, especially on the Pleistocene sandy soils.¹⁰ Currently the species is known from all provinces with the exception of the Province of Zeeland. The species occurs in more or less humid, shaded forests in moist places, e.g. along rivulets and streams. Because of its whitish inflorescences and its abundant leafage, May-early June is the best period to find this species.

***Carex colchica* J.Gay**

There are 198 collections of *Carex colchica* in L from the Netherlands (Table 1). The identification of these collections was in 129 cases correct (65%), albeit under the name *C. ligerica*. Of the remaining 69 collections, 49 were originally identified as *C. arenaria*, of which nine recent ones as *C. arenaria* s.l. Seven collections were identified as *C. praecox* (or its synonym *C. schreberi* Schrank), six as *C. pseudobrizoides* (as *C. reichenbachii*), one as *C. leporina*, and four were provisionally identified as '*Carex?*'. Finally, a single collection was regarded as being the hybrid of *C. praecox* with *C. pseudobrizoides* and another one as the hybrid of *C. praecox* with *C. curvata*. *Carex colchica* was confused with in particular *C. arenaria*, which shows a strong resemblance to *C. colchica*, but with *C. pseudobrizoides* and juvenile plants of *C. praecox* as well.

The oldest dated collection in L concerns material collected by J.J. Schuurmans Stekhoven, probably near Katwijk aan de Maas (Province of Noord-Brabant) around 1830 (*Schuurmans Stekhoven* 289, L.3113486). Initially, the material was identified as *Carex arenaria*. A collection made behind Brinkgreven near Deventer (Province of Overijssel) on May 26, 1846, by M.J. Cop was initially identified as *C. leporina*. This collection however, is a mixed collection of plants belonging to *C. arenaria* and a single specimen that belongs to *C. colchica*.

In addition, there are six undated collections from the nineteenth or early twentieth century, which were very probably made after 1850. In May 1847, Th.H.A.J. Abeleven collected material of *Carex colchica* near Rhenen, which he preserved under the name *C. ligerica*. One year later, in May 1848, he collected *C. colchica* near Nijmegen and labelled his material again with the name *C. ligerica*. Hence, the occurrence of *C. colchica* in the Netherlands was ascertained. However, in 1886 Kobus¹³ caused confusion by stating that the only Dutch material of *C. colchica* had been collected near Hillegommerbeek (Province of Zuid-Holland), all the other material was supposed to be *C. arenaria*. This state of confusion lasted until 1938, when Kern et al. solved the problem.¹⁶ In 1923, J.D. Kern and Th. Reichgelt¹⁷ collected material near Nijmegen. Based on the literature, they were convinced that this material belonged to *C. colchica*, although the plant from Nijmegen was obviously different from the plant collected near Hillegommerbeek. In 1938, Kern et al. finally concluded “dat de planten van Hillegommerbeek voortaan niet meer *C. ligerica*, maar *C. reichenbachii* behoren te worden genoemd” [that the plants from Hillegommerbeek should from now on no longer be called *C. ligerica*, but *C. reichenbachii*].¹⁶ The current name of *C. reichenbachii* is *C. pseudobrizonoides*. So, not only *C. colchica* is present in the Netherlands, but *C. pseudobrizonoides* occurs there as well. See for the latter species under *C. pseudobrizonoides*.

However, based on a study by Addink & Van der Meijden¹⁸, Van der Meijden et al.⁷ stated that “Zorgvuldig onderzoek ... heeft uitgewezen dat het niet mogelijk is om *C. ligerica* en *C. reichenbachii* naast (of als ondersoorten van) *C. arenaria* te onderscheiden.” [Careful research ... has proved that it is impossible to distinguish *C. ligerica* and *C. reichenbachii* ([as species] or as subspecies) from *C. arenaria*]. This interpretation of *Carex arenaria* was followed in the next two editions of Heukels' Flora van Nederland^{8 9}, but in 2005 Van der Meijden treated *C. arenaria* s.str., *C. ligerica* and *C. reichenbachii* again as separate species, unfortunately without giving any further explanation about his change of mind.

Of all 1068 collections examined, 198 (19%) belong to *Carex colchica* (Table 1). This species is, therefore, not very common in the Netherlands, and it is neither common elsewhere in Europe. However, when its distribution in the Netherlands¹⁰ is taken into account, *C. colchica* is less rare than previously thought. The species may have been overlooked as a consequence of the aforementioned synonymization with *C. arenaria* in three editions of Heukels' Flora^{7 8 9}, but its early flowering time, which makes the species less noticeable, may have played a role too.

In 2013, Koopman et al.¹⁹ presented an up to date overview of the distribution of *Carex colchica* in the Netherlands. Noteworthy is their discovery of a vast site along the road N34 between Hardenberg (Province of Overijssel) and Coevorden (Province of Drenthe), where in both roadsides the species was growing abundantly over a

distance of 10 km. From late April to early May, plants of *C. colchica* in the roadsides are easy to spot by car because of their conspicuously straw-coloured inflorescences.

***Carex praecox* Schreber**

There are 63 collections of *Carex praecox* in L from the Netherlands, of which 60 (95%) have been correctly identified (Table 1). A single collection was initially misidentified as *C. arenaria*, two as *C. colchica* (as *C. ligerica*).

The occurrence of *Carex praecox* in the Netherlands had been doubtful for a long time, although Th.H.A.J. Abeleven collected the first dated material already in 1848 near Nijmegen (Province of Gelderland). In 1935, the prominent botanists of their time became convinced about the occurrence of *C. praecox* in the Netherlands after the discovery of a rich population at the Poederooiensche Hoek (Province of Gelderland). In a period of eleven years, fourteen herbarium collections were made from this population, which are preserved in L. Simultaneously, new populations were found near, e.g., Pannerden, Millingen, and Keekerdom (all Province of Gelderland). Nowadays, at least one – rich – population is still present near Zutphen (Province of Gelderland).

Of all 1068 collections examined, 63 (6%) belong to *Carex praecox*. Hence it is the rarest of the five species of section *Ammoglochin* in the Netherlands. It was only collected in the Provinces of Gelderland, Utrecht, and Noord-Brabant. However, elsewhere in Europe the species is often abundant on sunny and usually slightly calcareous substrates and has often a striking appearance in April and May due to its dark brown inflorescences. When growing in dry, sandy roadsides, the species can easily be spotted by car in the first half of May, when the vegetation is still low.

***Carex pseudobrizoides* Clavaud**

There are 111 collections of *Carex pseudobrizoides* in L from the Netherlands, of which 78 (70%) have been correctly identified as *C. pseudobrizoides* or its synonym *C. reichenbachii* (Table 1). Eighteen collections were originally misidentified as *C. brizoides*, seven as *C. colchica* (as *C. ligerica*), five as *C. arenaria*, two as *C. leporina*, and one as *C. vulpina* L. The two collections presented under the name of *C. leporina*, made in 1835 near Leimuiden (Province of Zuid-Holland), are the oldest material of *C. pseudobrizoides* in L. Because these old collections were overlooked, the only known site of this species in the 19th was the one near Hillegommerbeek (Province of Zuid-Holland). However, as already mentioned in the treatment of *C. colchica*, Kobus¹³ caused confusion by attributing the Hillegommerbeek material to *C. colchica*, which resulted in an incorrect concept of *C. colchica* among Dutch botanists, a misconception only to become corrected by Kern et al.¹⁶ in 1938.

In 1936, another population of *Carex pseudobrizoides* was discovered in Duinrell near Wassenaar (Province of Zuid-Holland) by Siertsema, who initially thought the plants to belong to *C. brizoides*. Kern et al.¹⁶, however, identified the material as *C. pseudobrizoides*, by which the occurrence of this species in the Netherlands was

ascertained. In 1936 and 1937 they gathered as many as 20 collections.

In 1938, a population of *Carex pseudobrizoides* was discovered in Arcen (Province of Limburg), from which eleven collections were made in the same year. Additional collections were made in 1940 near Malden, near Nijmegen, and Drempt, near Doetinchem, and later also near Hummelo, Hoog-, and Laag-Keppel (all Province of Gelderland). The species is, among others, still abundant in the forests and the shaded and semi-shaded roadsides near Hoog-Keppel. In 1952, two collections, originally misidentified as *C. ligerica*, were made on the Grebbeberg (Province of Utrecht). In 1962, the species was found for the first time in the Province of Noord-Holland in the white sand dunes near De Zilk, Paardenkerkhof, followed by later collections made in the Amsterdamse Waterleidingsduinen. In 2005 the species was found on the West-Frisian Island of Schiermonnikoog, the most northern site for *C. pseudobrizoides* in the Netherlands.²⁰

Of all 1068 collections examined, 111 (10%) belong to *Carex pseudobrizoides*, which is therefore a rare species in the Netherlands.¹⁰ The species is endemic to Europe and occurs only in ten European countries³; in none of these countries it is common. However, where the species occurs it forms often vast populations that dominate the local vegetation because of its long creeping rhizomes. It occurs particularly in dry, shaded forests on the Pleistocene sand soils as well as in the white sand dunes along the coast. The species might have been overlooked in places with ‘Sandsedge’ in dry shaded forests, but further investigations are needed. The best time to search for *C. pseudobrizoides* is late May to early June. Flowering starts around the first of May. The inflorescences are pale because of the anthers and the pale female glumes and resemble those of *C. brizoides*. However, the inflorescence of *C. pseudobrizoides* is longer than that of *C. brizoides*. In addition, the leaves of *C. pseudobrizoides* are much broader than those of *C. brizoides* and flat. When older, plants of *C. pseudobrizoides* in the field resemble those of *C. arenaria*, but the plants of the former grow more upright and have greener inflorescences, because of their pale green female glumes and green utricles.

Identification key for the species within *Carex* section *Ammoglochin* in the Netherlands

Carex subgenus *Vignea* (P.Beauv. ex T.Lestib.) Heer

Inflorescence with 2 or more spikes; spikes (almost) similar in appearance; terminal spike (mostly) at least partly female; stigmas 2.

Section *Ammoglochin* Dum.

Plants with creeping rhizomes. Utricles weakly to distinctly winged for at least a part of their length, obscurely to conspicuously veined (Fig. 1).

1. At least one spike with male flowers at top → 6
- All spikes with female flowers at top (this is a rather variable character; check several inflorescences within a population) → 2

- 2. Utricles obscurely veined (Fig. 1: a & e) → 4
- Utricles conspicuously veined (Fig. 1: b & d) → 3
- 3. Leaves 1–2 mm wide, shorter than stems. Female glumes reddish-brown: **Carex colchica** J.Gay

When juvenile, in April-early May, plants of *Carex colchica* are rather similar to *C. praecox* in appearance. The inflorescences of *C. colchica*, however, are lighter coloured than those of *C. praecox*. When older, in June, *C. colchica* is more alike *C. arenaria*, but the inflorescences of *C. colchica* are reddish brown (Fig. 2: d) and have top spikes with female flowers and at a later stage ripe utricles, while those of *C. arenaria* are yellowish brown (Fig. 2: c) and have top spikes that are mostly completely male. In addition, the utricles of *C. colchica* (Fig. 1: d) are more narrowly winged than those of *C. arenaria*. (Fig. 1: c).

- Leaves 2–3 mm wide, exceeding stems in length. Female glumes pale whitish-green: **Carex pseudobrizoides** Clavaud

When juvenile, late April-early May, *Carex pseudobrizoides* is rather similar to *C. brizoides* in appearance, having very pale, whitish inflorescences (Fig. 2: b vs a). However, the leaves of *C. pseudobrizoides* are broader and its inflorescences are longer and more elongated than those of *C. brizoides* (Fig. 2: b vs a). When older, in June, *C. pseudobrizoides* is more alike *C. arenaria*, but the inflorescences of *C. pseudobrizoides* are greenish, while those of *C. arenaria* are yellowish brown (Fig. 2: b vs c).

- 4. Leaves not more than ½ as long as stems; spikes dark brown: **Carex praecox** Schreber

When juvenile, the leaves are much shorter than the flowering stems. Later in the season, however, the leaves become more elongated and exceed the fruiting stems in length.

- Leaves exceeding stems → 5

When the plants are flowering, the leaves are already longer than the stems.

- 5. Spikes pale whitish-creme: **Carex brizoides** L.

- Spikes light brown: **Carex curvata** Knaf

Carex curvata is intermediate in all its features, including the utricles, between *C. brizoides* and *C. praecox*. The utricles are a reliable character to distinguish these three species from each other. Hitherto, *C. curvata* has not been found in the Netherlands.

- 6. Middle spikes with female flowers above and male below. Inflorescence greenish (Fig. 2: b); female glumes pale-greenish: **Carex pseudobrizoides** Clavaud

- Middle spikes with male flowers above and female below. Inflorescence yellowish-brown (Fig. 2: c); female glumes brown: **Carex arenaria** L.

Carex arenaria has the broadest utricles with the broadest wings within section *Ammoglochin* (Fig. 1: c).

Specimens of hybridogene origin?

Eight collections made near Amerongen (Province of Utrecht) between 1954 and 1963 deserve special attention, because they are difficult to identify. Six of them,

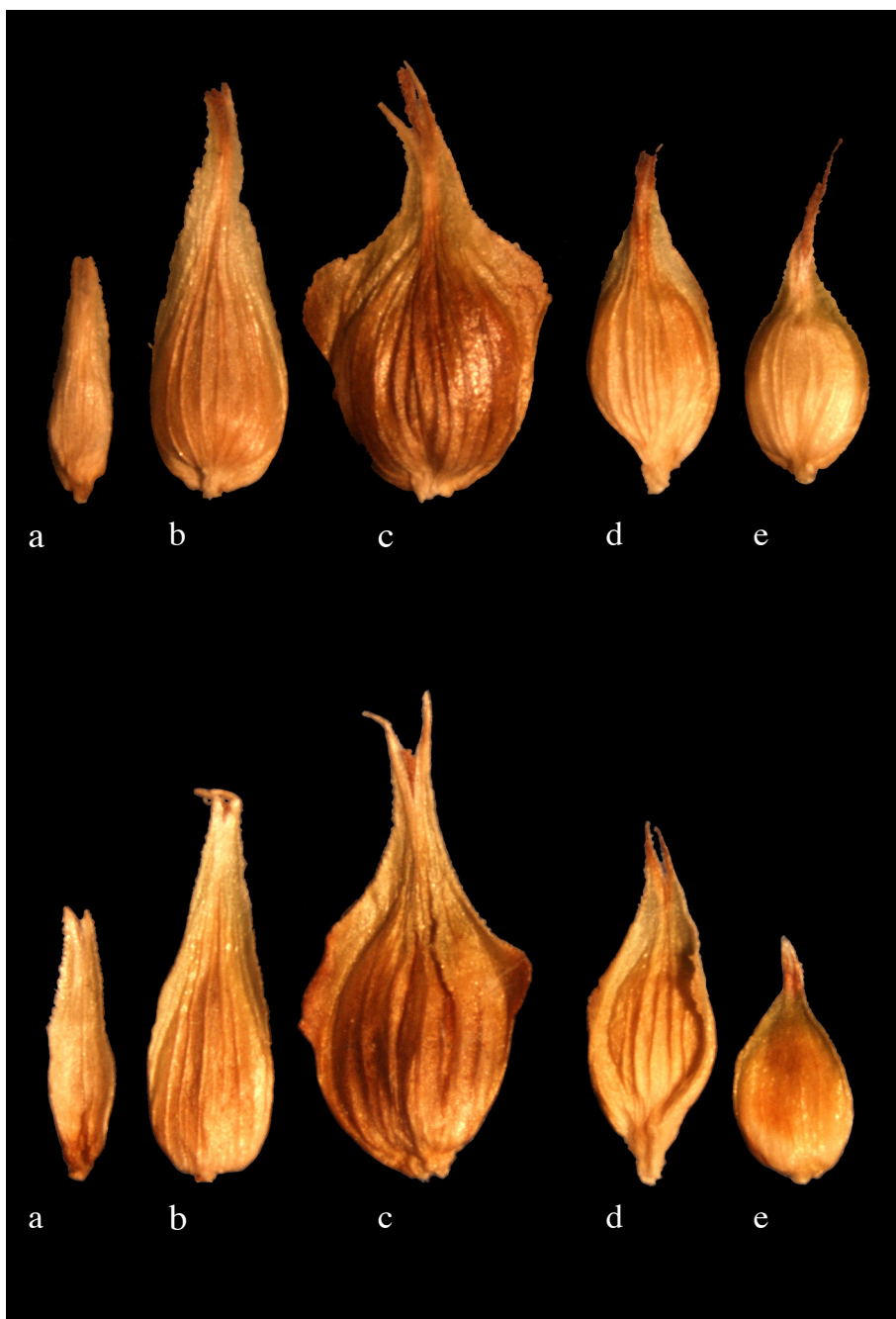


Fig. 1. Utricles of the five species of *Carex* L. section *Ammoglochin* Dum. occurring in the Netherlands from the abaxial side (upper row on photo) and the adaxial side (lower row): a: *Carex brizoides* L.; b: *C. pseudobrizoides* Clavaud; c: *C. arenaria* L.; d: *C. colchica* J.Gay; e: *C. praecox* Schreber. Photos: Jacob Koopman & Helena Więctaw.

collected in the 1950s, were initially identified as *Carex curvata*, a species the authors have seen at the ‘locus classicus’ in the Czech Republic as well as in Germany. This species is often regarded as being conspecific with *C. praecox*^{3 21} or as a synonym of a subspecies of *C. praecox*^{22 23}, i.e. *C. praecox* subsp. *intermedia* (Čelak.) W.Schultze-Motel. Other authors consider *C. curvata* to be a good species, with characters intermediate between *C. brizoides* and *C. praecox*.^{24 25}

A specimen that was collected by Reichelt and Zonderwijk at the edge of a high bank of the River Lek near Amerongen (‘*Th. R. en P. Zonderwijk*’ s.n., June 26, 1954, L.3114182), which was identified as *Carex* cf. *curvata*, was annotated by one of the collectors on a separate note to come from a population with “Duizenden bloeistengels, maar alle volkomen steriel. Aan 1 ex. enkele slecht ontwikkelde vruchtjes. Kafjes zeer licht van kleur (mogelijk veroorzaakt door steriliteit?)” [Thousands of flowering stems, but all totally sterile. One specimen with a few poorly developed fruits. Glumes very light coloured (possibly caused by sterility?)]. It is further remarked ‘In cultuur nemen om te zien of steriliteit toevallige oorzaken heeft’ [To be taken into cultivation to see whether the sterility has coincidental causes]. On another label is written: “Non est *C. curvata* Knaf, cf. *C. ligerica* Gay × *C. brizoides* L. Determinavit G.H. Parent 1972.” So, the Belgian botanist Parent²⁶

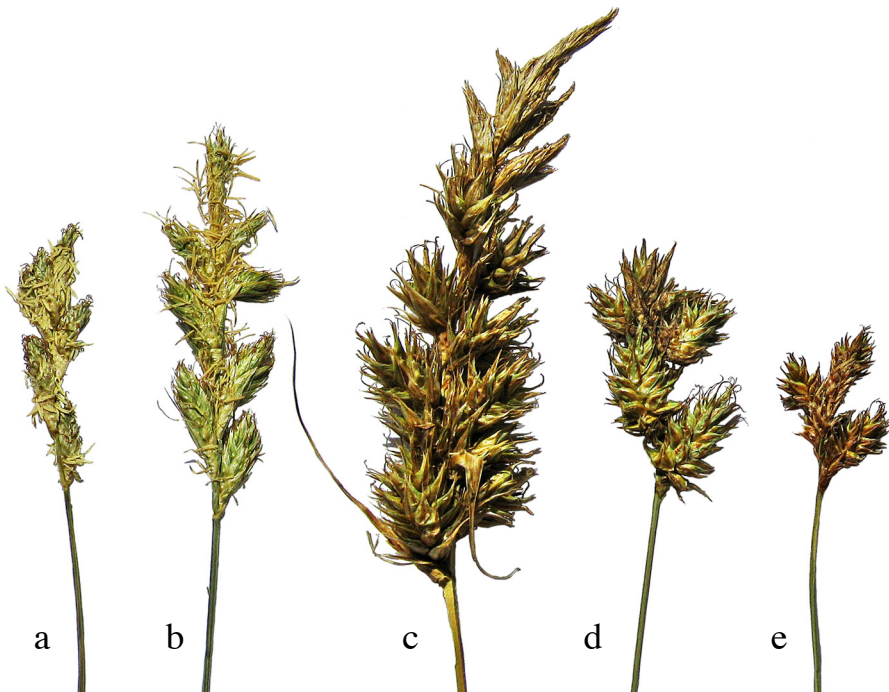


Fig. 2. Inflorescences of the five species of *Carex* L. section *Ammoglochin* Dum. occurring in the Netherlands: a: *Carex brizoides* L.; b: *C. pseudobrizoides* Clavaud; c: *C. arenaria* L.; d: *C. colchica* J.Gay; e: *C. praecox* Schreber. Photo: B. Bosiacka, Faculty of Biology, University of Szczecin.

tentatively considered the plant to be a hybrid between *C. brizoides* and *C. ligerica*. Parent also examined a specimen collected by Van Ooststroom between Amerongen and Elst in 1955 (*Van Ooststroom 18606*, L.3114180), which he considered to be a possible hybrid as well.

A collection made by F.M. Muller in 1963 was initially identified as *C. cf. xcolchica* (as *C. cf. xligerica*). Although this specimen is difficult to identify, it is certain that this material does not belong to *Carex curvata*. The only possible way for further identification would be sampling additional material from the population, which is, of course, only possible if the population still exists.

In conclusion, the specimens collected near Amerongen are very probably of hybridogene origin.

Final remarks

It is interesting and instructive to pay attention to the descriptions and annotations on herbarium labels, because they may provide information on historic species circumscriptions and the process of species identification in the past. It sometimes



Fig. 3. Nutlets of the five species of *Carex* L. section *Ammoglochin* Dum. occurring in the Netherlands (two nutlets of each species): a, f: *Carex brizoides* L.; b, g: *C. pseudobrizoides* Clavaud; c, h: *C. arenaria* L.; d, i: *C. colchica* J.Gay; e, j: *C. praecox* Schreber. Photo: Jacob Koopman & Helena Więcław.

clarifies why certain misidentifications were made. For instance, when 19th and early 20th century Dutch botanists identified *Ammoglochin* material and had to distinguish between *Carex arenaria* or *C. colchica*, they focussed almost entirely on the gender distribution of flowers in the inflorescence, because they were unaware of better distinguishing features. Although differences in gender distribution between these species exist, the gender distribution is, unfortunately, very variable, so when using this character for identification, one has to examine several plants from the same population. Moreover, one should consider other characters as well, like the colour and size of the inflorescence, e.g., being straw-coloured yellowish-brown in *C. arenaria* versus red-brown in *C. colchica* (Fig. 2). However, almost conclusive are the shape and size of the utricles and the nutlets of these two species (Fig. 1 & 3). These characters seem to be rather constant and therefore reliable, but it is very difficult to properly describe the differences in utricles and nutlets between the species; therefore we have included a few macro photos of the utricles and the nutlets (Fig. 1 & 3).

The photos in Fig. 1 & 3 have been made with a Zeiss Discovery V12 microscope (8×) at the Faculty of Biology, University of Szczecin, Poland. We are grateful to Dr A. Szlauer-Łukasiewska for the use of this microscope and to Dr hab. B. Bosiacka for making the photo of the inflorescences.

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