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New and noteworthy plants from the northern Italian ricefields

by *C.D.K. Cook*

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The flora of the Italian ricefields particularly in the region near Vercelli and Novara has attracted botanists for nearly a hundred years because of its richness in aquatic and marsh species. Many of the species have been introduced and are dependent for their existence on the cultivation of rice. Rice is cultivated as an aquatic annual but the ricefields are drained before the crop is harvested. After the harvest the fields are ploughed while dry and are reflooded when the new rice crop is planted. As mentioned by van Steenis (1957) the plants that grow in ricefields are specialised as they must either complete their generative phase before the rice harvest or have perennating organs that can withstand dry ploughing.

A review of the vascular plant species and communities of this region was published by Pirola (1964). Later notes have been published by Becherer (1969), Corbetta (1968), Evoli and Pirola (1971), and Pirola (1965, 1968a, 1968b). The most detailed accounts of the flora around Vercelli are those of Koch (1952, 1954). Koch visited the region in 1951; twentyone years later we followed Koch's footsteps and found his described plant communities virtually unchanged. All the introduced species that he discovered in this area were still growing well so it would appear that this specialised and largely introduced flora is reasonably stable.

In August 1972 accompanied by staff and students of the Institut für Systematische Botanik der Universität Zürich I visited the region around Vercelli. Our itinerary was as follows (the cited collecting localities are in brackets): 22 August 1972, ricefields each side of the main road between Vercelli and Novara, NE. of Orfengo (Orfengo): 23 August, banks of the River Cervo and nearby ricefields, about 7 km NNE. Vercelli (Cervo); south of the autostrada about 2 km N. of Villarboit and 2 km W. of Gréggio (Gréggio); SW. of Albano Vercellese (Albano); Stazione Sperimentale di Risicoltura, about 3 km SW. Vercelli (Stazione di Risicoltura); 24 August, Prarolo about 7 km SE. Vercelli about 1 km N. of Prarolo (N. Prarolo) and about 3 km E. of Prarolo beyond Cascina Colombina (E. Prarolo).

The primary reason for our visit was to see unusual or rare plant species so we visited almost exclusively well documented areas. It is therefore rather surprising that we found species not only new to the region but also new to Europe. The following species are new to Europe:

Eriocaulon cinereum R.Br.
Murdannia blumei (Hassk.) Brenan
Rotala densiflora (Roth) Koehne
Rotala ramosior (L.) Koehne

The following plants are new to Italy but known elsewhere in Europe:

Elatine ambigua Wight
Sparganium erectum subsp. *microcarpum* (Neuman) Domin

Rice has been cultivated around Vercelli since at least 1475. Today nearly all the rice-growing land is in private hands. The Italian Ministry of Agriculture has, however, forbidden private importation of rice seed and all importations are first controlled and grown in the Stazione di Risicoltura at Vercelli before being released to the growers. Among other things, this process is likely to reduce the number of new weed introductions in the future. Except for a second locality for *Eriocaulon cinereum* we found no new or particularly interesting species in the rice testing grounds.

Specimens of the following plants have been deposited in the herbarium of the Institut für Systematische Botanik der Universität Zürich (Z).

Pteridophyta

Azollaceae

Azolla caroliniana Willd.

In ricefields and slow flowing or stagnant irrigation ditches (N. Prarolo). No fertile plants were found so the determination must be regarded as provisional. It is a native of North America but is widely naturalised in Europe.

Isoetaceae

Isoetes malinverniana Cesati and De Notaris.

In artificially maintained streams and canals (Cervo and Albano) particularly abundant near bridges. It is endemic in this region. For further information on this species see Becherer (1969) and Corbetta (1968).

Marsileaceae

Marsilea quadrifolia L.

Widespread and common usually found at the corners of ricefields. Plants with ripe sporocarps were found at Orfengo.

Salviniaceae

Salvinia natans (L.) All.

In ricefields, among *Typha latifolia* and *Sparganium erectum* and in slowly flowing irrigation ditches (E. Prarolo). Plants stranded by the falling water level were fully fertile while many floating plants were sterile.

Spermatophyta

Alismataceae

Alisma lanceolatum With.

In ricefields and irrigation ditches, only found south of Vercelli (Stazione di Risicoltura, N. Prarolo, E. Prarolo).

Alisma plantago-aquatica L.

Common in all areas visited.

Sagittaria sagittifolia L.

Common, often found in the linear-leaved state in flowing water.

Asteraceae [*Compositae*]

Bidens cernua L.

Common at edges of ricefields.

Bidens frondosa L.

Common on banks and by paths but mostly sterile. Introduced from North America but widespread in Europe.

Brassicaceae [*Cruciferae*]

The following *Rorippa* hybrids were collected:

Rorippa austriaca (Cranz) Besser X *sylvestris* (L.) Besser, growing on a clay bank by a ricefield near Albano.

Rorippa austriaca (Cranz) Besser X *amphibia* (L.) Besser, growing at the edge of a ricefield near Gréggio.

Butomaceae

Butomus umbellatus L.

Not abundant but widespread, usually found in irrigation ditches (Orfengo, Albano, Prarolo).

Callitrichaceae

Callitriche stagnalis Scop.

In streams usually sterile, one fruiting specimen was found at Cervo. Other species of *Callitriche* were seen but not well enough collected for positive determinations.

Ceratophyllaceae

Ceratophyllum demersum L.
In ditches, only sterile plants were found.

Commelinaceae

Commelina communis L.
Widespread, found at the edges of roads, paths, ditches and streams.

Murdannia blumei (Hassk.) Brenan, [*Aneilema hamiltonianum* Wall. ex Clarke], for a note on the nomenclature of this species see: Brenan, J.P.M., in Hooker's Icones Plantarum 6 (4), tab. 3578 (1962).

M. blumei was very common and found in all localities visited. It shows a remarkably wide ecological amplitude and was found on dry banks by roads and paths, on wet banks of streams and ditches, and totally or partially submerged in streams, ditches and ricefields. It appeared to be so well established and widespread around Vercelli that it is unlikely to be a recent introduction. However, earlier botanists may be excused for missing this species because it seems to flower very rarely. We found eight plants with flowers from literally thousands of sterile ones. It is also likely that the flowers are shortlived, we collected it at about 15.00 hrs on a cold, dull, rainy day. It is probable that previous visiting botanists have regarded it as *Commlina communis.* However, in the sterile state it differs from *C. communis* in having longer internodes and longer, narrower leaves.

Murdannia blumei is widespread in India and South East Asia where it is reported to be a weed of ricefields. Although this is the first record of this species for Europe its present distribution around Vercelli suggests that it is not a recent introduction but has been overlooked.

Cyperaceae

Eleocharis acicularis (L.) Roem. and Schultes.
Widespread and common in ricefields.

Eleocharis obtusa (Willd.) Schultes.
Widespread and very common in and beside ricefields. It is a native of America.

Eleocharis olivacea Torrey
A solitary plant was found in a ricefield about 2 km north of Prarolo. It is a native of America.

Eleocharis soloniensis (Dub.) Hara [*E. ovata* (Roth) Roem and Schultes].
One small population was found at the corner of a ricefield near Orfengo.

Cyperus difformis L.
At the edges of ricefields and in irrigation ditches at Orfengo.

Cyperus flavescens L.
In a ricefield at Orfengo and along the banks of the River Cervo.

Cyperus fuscus L.
On sandy banks by the River Cervo.

Cyperus glomeratus L.
Abundant along the banks of the River Cervo.

Cyperus longus L.
In a ricefield at Orfengo.

Cyperus serotinus Rottb.
In ricefields and along the banks of the River Cervo.

Cyperus strigosus L.
On sandy and gravelly banks by the River Cervo. *C. strigosus* does not seem to have been reported in any lists of the ricefield vegetation. It is however, reported in Fiori (1923) as naturalised in Piemonte.

Schoenoplectus mucronatus (L.) Palla [*Scirpus mucronatus* L.]
A widespread and common weed in ricefields.

Schoenoplectus supinus (L.) Palla [*Scirpus supinus* L.]
At the edge of a ricefield 2 km west of Gréggio.

Scirpus maritimus L.
Common in irrigation ditches, occasionally found in ricefields.

Elatinaceae

Elatine ambigua Wight.
E. ambigua is like *E. triandra* Schkuhr but the flowers are shortly pedicellate and the capsules turn to one side away from the leaf axil at maturity; an excellent illustration may be seen in Mason (1957). *E. ambigua* is native in South and East Asia where it is frequently found as a weed in ricefields. It has become naturalised in the ricefields of North America and the Carpathian region of Europe (Czechoslovakia, Romania and the Mokdavia and Middle Dnepr regions of Russia). Its discovery in Italy in ricefields is not very surprising.
Elatine ambigua is very common around Vercelli and was found in very nearly every ricefield that we visited. Its present distribution around Vercelli and Novara does not suggest that it is a very recent arrival but that it has been overlooked. Therefore, Koch's material deposited in the Herbarium of the Eidgenössische Technische Hochschule, Zürich (ZT) was examined. It was found that almost half of Koch's specimens of *Elatine* from the ricefields were, in fact, *E. ambigua.* It is at least certain that *E. ambigua* was present and widespread in North Italy in 1951.

Elatine hexandra (Lapierre) DC.
In spite of a thorough search for this species only one plant was found and it was discovered accidentally while cleaning material of *Rotala ramosior* for the press. It was collected about 2 km north of Prarolo.

Elatine triandra Schkuhr.
It was very common and occured in almost every ricefield visited. It was usually found growing together with *E. ambigua.* However, certain ecological differences between the two species could be seen. *E. triandra* shows more preferences towards genuinely aquatic habitats, for example, it is often found

in flowing water, in streams and irrigation ditches where it superficially resembles *Callitriche stagnalis* Scop. In contrast, *E. ambigua* is very rarely found in flowing water and when found it has much more linear submerged leaves. In the ricefields *E. triandra* grows in the deeper water and is characteristically found in the Ottelieto-Najadetum gracillimae association (Koch, 1954) while *E. ambigua* is characteristic for the dryer edges of the ricefields and is found in the Eleocharetum ovatae or Oryzeto-Cyperetum difformis (Koch, 1954) associations.

Eriocaulaceae

Eriocaulon cinereum R. Br. [*E. sieboldianum* Sieb. and Zucc.].

It was found in shallow water in ricefields at Gréggio and at the Stazione di Risicoltura. On 1 August 1957, H. Merxmüller and W. Wiedmann collected three immature and thus indeterminable rosettes of *Eriocaulon* near Gréggio (specimens deposited in the herbarium of the Botanische Staatssammlung München, M). In 1972 we revisited this area and found abundant mature *E. cinereum*. My determination has been checked by T. Koyama, D. Meikle and H.N. Moldenke. I have examined Merxmüller's material and there is no reason to doubt that it is also *E. cinereum*.

E. cinereum is a common, pantropical weed of ricefields so it not possible to give the origin of the Vercelli plants. However, it is possible to say that it has been in the Vercelli region for at least 15 years. Among the normal *E. cinereum* we collected two somewhat smaller, dark-headed plants. Unfortunately our material was inadequate for certain identification but the possibility exists of a second species being present.

Euphorbiaceae

Acalypha virginica L.

It was found growing on the edges of ricefields and on the banks of streams around Albano.

Fabaceae [*Leguminosae*]

Apios americana Medikus.

Although it is not a weed in ricefields it has become very common along the River Cervo and on the banks of canals, streams and ditches (Orfengo, Gréggio, Albano, Prarolo). It is a native in North America.

Haloragaceae

Myriophyllum spicatum L.

It was found growing in the River Cervo and in a stream at Orfengo.

Hydrocharitaceae

Blyxa japonica (Miquel) Maxim. ex Asch. and Gürke.

It was found about 2 km west of Gréggio. It grew in shallow water among rice plants; it was abundant but local in its distribution. It is a native of East and South East Asia.

Elodea canadensis Michx.

It was found in flowing water in a stream at Orfengo and in a ditch at Albano. It is a native of North America but widely naturalised in Europe.

Ottelia alismoides (L.) Persoon.

It was found in ricefields at Orfengo, Gréggio and Albano. Shortly before his death Koch considered *O. japonica* Miquel to be a separate species (see Ernst-Schwarzenbach, 1956) and he was of the opinion that the Italian plants were true *O. japonica.* From herbarium material I can find no consistent difference between *O. japonica* and *O. alismoides.* In India, where I have had the opportunity to study *O. alismoides,* it is a large plant with pale green, almost translucent leaves and has large, pure white petals. In Italy the plants are smaller with reddish, opaque leaves and smaller flowers with pale blue petals. Aquatic plants are notoriously plastic and specific differences based on size of leaves and petals are suspect. Unforunately the colour differences can not be seen on herbarium material so it felt better in the absence of more detailled work to leave the Italian plant in *O. alismoides.*

Lemnaceae

Lemna gibba L.

Widespread, flowering plants seen at Cervo, Albano and Prarolo.

Lemna minor L.

Widespread, flowering plants seen at Albano and Prarolo.

Lemna perpusilla Torrey [*L. paucicostata* Heglm.].

It was collected only at Cervo but may have been more widespread.

Spirodela polyrhiza (L.) Schleiden.

Widespread and common in ricefields and irrigation ditches. It was usually growing together with *Lemna gibba.*

Lentibulariaceae

Utricularia australis R. Br. [*U. neglecta* Lehm.].

It was widespread in a variety of aquatic habitats but was found in flower only at Albano.

Lythraceae

Lythrum portula (L.) D.A. Webb [*Peplis portula* L.].

It was found in a ricefield and an ajoining irrigation ditch north of Prarolo.

Lythrum salicaria L.

It was abundant in all regions visited.

Rotala densiflora (Roth) Koehne.

It was found north of Prarolo growing in shallow water among rice plants. The stems are up to 30 cm tall, simple or branched from the base. The leaves are opposite and decussate, lanceolate with a distinctly cordate base. The flowers are solitary and sessile in the leaf axils; each flower being subtended by two, small, scarious bracteoles. The calyx is lobed and between each lobe are

long subulate epicalyx segments. The petals are distinct and pink. The style is half to two-thirds as long as the ovary and persists in fruit.

R. densiflora is native in South and East Asia northwards to South China, in the Sudan, Africa and in Queensland, Australia. It is a common ricefield weed in India and its discovery in the Italian ricefields is perhaps not very surprising.

Ammannia verticillata (Ard.) Lam., which superficially resembles *R. densiflora,* was not found on our excursion but it is reported to be common and a characteristic species for the „Oryzeto-Cyperetum difformis" association (Pignatti, 1957). S. Pignatti kindly sent me herbarium material of *A. verticillata* and I can confirm that it is correctly determined.

Rotala indica (Willd.) Koehne

It is widespread and common; it is almost confined to ricefields but there is hardly a ricefield without it.

Rotala ramosior (L.) Koehne

It was found north of Prarolo at the edge of ricefield, growing together with *Rotala densiflora, R. indica* and *Lythrum portula.* The stems of *R. ramosior* are erect, simple or branched from below. The leaves are opposite and decussate, oblanceolate to linear- oblanceolate, attenuate to a sessile or subsessile base. The flowers are solitary and sessile in the leaf axils; each flower being subtended by two, persistent bracteoles about half as long as the fruit. The calyx lobes are broadly triangular and epicalyx lobes elongate-triangular and longer than the calyx lobes. The petals are minute or absent. The style is shorter than the ovary and not distinctly persistent in fruit.

R. ramosior is native in America from Washington to Massachusetts southwards to Brasil and Ecuador. It is also naturalised in ricefields in the Philippines. It is a distinctive plant and is unlikely to have been confused with other plants around Vercelli and it is possibly a fairly recent introduction to Europe. However, it is not known whether it was introduced directly from America, perhaps along with *Lindernia dubia, Eleocharis obtusa* and *E. olivacea* or from the Philippines where it is known to grow with *Rotala densiflora.*

Najadaceae

Najas gracillima (A. Br.) Magnus

It was common and found in all regions visited. Its true origin is doubtful, it is found in eastern North America and Japan.

Najas minor All.

It was collected only at Albano but is probably more widespread and overlooked by us because it grows entangled with *N. gracillima.*

Nymphaeaceae

Nuphar lutea (L.) Sm.

It was found once and then in swiftly flowing water in a stream by the River Cervo. Although the habitat is unusual for *N. lutea* it was apparently growing well and fruiting.

Poaceae [*Gramineae*]

Alopecurus aequalis Sobol.

It was found in an almost dry ricefield at Orfengo. *A. geniculatus* L. was not found.

Digitaria ciliaris (Retz.) Koel [*D. adscendens* (H.B.K.) Henr.].

It is common and usually found on the mud dams between ricefields but was also found on sandy banks by the River Cervo. *Digitaria sanguinalis* (L.) Scop. has been reported from Novara and Vercelli (Pirola 1964) but was not found during our excursion. *D. ciliaris* is like *D. sanguinalis* but has a more prominent ligule, smooth nerves on the lower lemma and generally has more inflorescence branches. *D. ciliaris* is widespread in the Tropics and is occasionally found in ricefields. It is sporadic in its occurrence in Europe but as far as I know has not been recorded for Piemonte.

Echinochloa crusgalli (L.) P. Beauv.

The variation of this species in the Italian ricefields has been described by Pirola (1965) and Evoli and Pirola (1971). For the variants of this species I prefer to use varietal status rather than subspecific status as suggested by Pirola for the Italian taxa; the commoner one was var. *crusgalli,* which was found in all localities, var. *breviseta* (Doell) Neilr. was equally widespread but less common.

Echinochloa cruspavonis (H.B.K.) Schultes

A widespread weed in ricefields. *E. phyllopogon* (Stapf) Koss. and *E. frumentacea* Link were not collected.

Eragrostis pilosa (L.) P. Br.

It was found on sandy banks by the River Cervo.

Leersia oryzoides (L.) Swartz.

Very commonly found on the banks of irrigation ditches and on the mud dams between ricefields.

Panicum dichotomiflorum Michx.

Commonly found around ricefields on mud dams, beside roads and on sandy banks by the River Cervo. It is native in America.

Sorghum halepense (L.) Pers.

Growing among *Typha latifolia* and *Sparganium erectum* surrounding a small pond east of Prarolo.

Potamogetonaceae

Potamogeton crispus L., *P. perfoliatus* L. and *P. nodosus* Poir., *P. fluitans* Roth were common in ditches and streams. Unfortunately, the narrow-leaved species were insufficiently collected.

Ranunculaceae

Ranunculus sceleratus L.

A few plants were found at the edge of a ricefield at Orfengo and nowhere else.

Scrophulariaceae

Lindernia dubia (L.) Pennell.

In shallow water or on wet mud in and around ricefields, also found in wet sandy hollows along the River Cervo. Two morphologically distinct races of *L. dubia* were found. The first is like *L. dubia* as described by Koch (1952); it has pedicels up to 20 mm long but shorter than the subtending bracts, and leaves up to 30 mm long and narrowed at the base and with an almost smooth margin. The second race has pedicels up to 40 mm long which exceed the length of the subtending bracts, and leaves that are shorter and wider at the base with a toothed margin; in general this race approaches *L. anagallidea* (Michx.) Pennell. However, *L. anagallidea* sensu stricto has seeds up to 3 times as long as wide and short leaves that clasp the stem; these characters are not seen in the Vercelli material. D. Philcox is of the opinion that both Vercelli races should be included in *L. dubia* but at the same time he admits that this species complex is in need of revision. Koch collected many specimens in 1951 and all are of *L. dubia* sensu stricto. It is possible that this second, *L. anagallidea*-like race is a more recent introduction.

Lindernia procumbens (Krock.) Philcox [*L. pyxidaria* L.].

It seems to have become rather rare. We found two plants only; they were growing in a wet sandy hollow by the River Cervo.

Sparganiaceae

Sparganium emersum Rehm. [*S. simplex* Hudson].

Found in irrigation ditches and streams, quite common but rarely flowering (Orfengo, N. Prarolo).

Sparganium erectum L. [*S. ramosum* Hudson].

Subspecies *microcarpum* (Neuman) Domin was found surrounding a small pond east of Prarolo. This appears to be the first record of subsp. *microcarpum* for Italy; however, it is known from adjoining regions and it was to be expected.

Subspecies *neglectum* (Beeby) Schinz and Thellung is common in irrigation ditches and canals.

Trapaceae

Trapa natans L. sensu latissimo

It was found in a small pond about 2 km east of Prarolo. Species delimitation in the genus *Trapa* is difficult and disputed. The material collected at Prarolo looked like *Trapa bicornis* Osbeck, a species widely cultivated in South and East Asia. The fruits of the Prarolo plants were up to 4 cm long and bore 2 large horns with unbarbed, blunt points. The rosettes were rather larger than normal European *T. natans* with petioles up to 18 cm long.

Summary

An account is given of the plants found during an excursion to the North Italian ricefields in the region of Vercelli and Novara. *Eriocaulon cinereum* R. Br., *Murdannia blumei* (Hassk.) Brenan, *Rotala densiflora* (Roth) Koehne and *Rotala ramosior* (L.) Koehne are reported for the first time for Europe. *Elatine ambigua* Wight and *Sparganium erectum* subsp. *microcarpum* (Neuman) Domin are reported for the first time from Italy.

Zusammenfassung

Es wird über Pflanzen berichtet, die während einer Exkursion in die Reisfelder der Region Vercelli und Novara (Norditalien) gefunden wurden. *Eriocaulon cinereum* R. Br., *Murdannia blumei* (Hassk.) Brenan, *Rotala densiflora* (Roth) Koehne und *Rotala ramosior* (L.) Koehne sind zum ersten Mal in Europa festgestellt worden. *Elatine ambigua* Wight und *Sparganium erectum* subsp. *microcarpum* (Neuman) Domin wurden zum ersten Mal für Italien gefunden.

Résumé

Il s'agit d'un rapport des plantes qu'on a trouvé à l'occasion d'une excursion en Italie du Nord, principalement dans les rizières des régions de Vercelli et Novara. C'était pour la première fois qu'on a constaté en Europe *Eriocaulon cinereum* R. Br., *Murdannia blumei* (Hassk.) Brenan, *Rotala densiflora* (Roth) Koehne et *Rotala ramosior* (L.) Koehne, et pour la première fois qu'on a trouvé en Italie *Elatine ambigua* Wight et *Sparganium erectum* subsp. *microcarpum* (Neuman) Domin.

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