

## *Urtica galeopsifolia* Wierzb. ex Opiz (Urticaceae) in Wicken Fen (E. England)

D. V. GELTMAN

Herbarium, Komarov Botanical Institute, Prof. Popov St 2, St Petersburg 197376,  
Russian Federation

### ABSTRACT

A plant resembling the common nettle, *Urtica dioica* L., but almost lacking stinging hairs, occurs in Wicken Fen, Cambridgeshire. It is here considered as a separate species *U. galeopsifolia* Wierzb. ex Opiz, which differs from the former by several morphological characters and also by ploidy level. Some suggestions about the possible hybrid origin of *U. dioica* are put forward.

### INTRODUCTION

Many British botanists know the strange almost stingless form of the common nettle (*Urtica dioica* L.), which occurs within the National Trust's Wicken Fen nature reserve in Cambridgeshire, GR TL/55.70. These unusual plants grow in damp mesotrophic fen communities, in particular, at the margins of shrubby areas with other shade-tolerant herbs. Similar plants occur nearby, as at Chippenham Fen (Perring *et al.* 1964).

The variation of morphological characters of *U. dioica*, with special reference to this particular population, was intensively investigated by Pollard & Briggs (1982, 1984a). They explained that the difference of this plant from typical ones arose through a process of gene flow. An exact taxonomic recognition had not been made, but it was mentioned that, probably, the 'Wicken nettle' belongs to var. *angustifolia* Wimm. & Grab. or var. *subinermis* Uechtr. The *Flora of Cambridgeshire* (Perring *et al.* 1964) treats these plants as f. *angustifolia* (Wimm. & Grab.) Moss.

While studying the taxonomy of *Urtica* L. in the former U.S.S.R., I paid attention to the information published by Pollard & Briggs (1982). My assumption was that the "Wicken form of common nettle" seemed to belong to a separate species, *U. galeopsifolia* Wierzb. ex Opiz, which I have recognised for Eastern and Central Europe (Geltman 1986, 1992) or to some intermediate form between this species and *U. dioica*.

### URTICA DIOICA AND U. GALEOPSIFOLIA

*U. galeopsifolia* was described from Hungary by F. M. Opiz, *Naturalientausch* 9: 107 (1825), according to Domin (1943), and it differs from *U. dioica* mainly by characters of the leaf blades: they almost completely lack stinging hairs, but always possess a more or less dense indumentum consisting of simple (non-stinging) hairs. It is also differentiated by the location of its inflorescence; the lowest flowering branches of *U. galeopsifolia* appear on the level of the 13th–22nd node, and in *U. dioica* on the level of the 7th–14th node. Probably, this feature is linked to the period of flowering: *U. galeopsifolia* starts to flower later than *U. dioica*, approximately in mid-July (Geltman 1986).

Not infrequently *U. galeopsifolia* has somewhat longer and comparatively narrow leaves, but this character is unsatisfactory, as typical *U. dioica* with numerous stinging hairs may sometimes have such a leaf shape. It is necessary to stress that neither *U. galeopsifolia* nor *U. dioica* have such narrow leaves as the Asiatic species *U. angustifolia* Fisch. ex Hornem., which does not occur in Europe.

Unlike *U. dioica*, which is mostly tetraploid with  $2n = 52$  or, probably,  $2n = 48$  (there are only a

few records of  $2n = 26$ ), *U. galeopsifolia* is presumably diploid ( $2n = 26$ ) and only one specimen was determined as tetraploid (Geltman 1984).

*U. galeopsifolia* prefers a quite distinct type of habitat: damp woodlands, especially with *Alnus glutinosa* (L.) Gaertner, river banks and valleys, and eutrophic fens. I found a very clear example of the ecological separation of the two species in question in Central Ukraine, Cherkassy region. *U. galeopsifolia* occurred in *Phragmites* fen and *Alnus glutinosa* woodland, situated in deep valleys, bordered with hills, and *U. dioica* is found in more or less dry (at least, not swampy) *Carpinus betulus* L. woodlands on the hills, especially near roads and cattle paths.

In the former U.S.S.R., *U. galeopsifolia* is distributed in the European part to the south of latitude  $60^{\circ}\text{N}$ , and also in the southern regions of Siberia eastwards to the river Angara; some localities are also known from Caucasia. It should be widely distributed in Atlantic, Central and East Europe, but before I had visited some British herbaria, I had seen quite reliable specimens of this species only from Hungary, Czechoslovakia and the Netherlands (Geltman 1986).

In August 1991, I was fortunate to be able to visit Wicken Fen and to observe the local nettle population. In my view, the almost stingless plants which occur in the fen proper do not differ from *U. galeopsifolia*, as it occurs in Russia. So, *U. galeopsifolia* is a new species record for the British flora.

*U. galeopsifolia*, nevertheless, is not a 'completely good' species, especially in terms of the species concept adopted in *Flora Europaea* (Geltman 1992). Sometimes transitional forms to *U. dioica* may be found, such as forms without stinging hairs but with scattered simple ones (I usually refer such plants to *U. dioica*). So, probably, some botanists may prefer to treat this taxon as a subspecies; the corresponding combination *U. dioica* subsp. *galeopsifolia* (Wierzb. ex Opiz) Chrték does exist (Chrték 1981). But I consider that species rank is more appropriate for this taxon for the following reasons. It is correct to apply the rank of subspecies to allopatric taxa of widely distributed species. But in the case of *U. dioica* and related species we have, obviously, quite a different situation: *U. dioica* is, probably, a species of hybrid origin (Geltman 1990). The first of its ancestors might be *U. galeopsifolia* (or a species closely related to it) and the second, *U. sondenii* (Simm.) Avrorin ex Geltman, which occurs mainly in the taiga zone of West and Central Siberia and Northern Europe also. Detailed distribution characteristics with map are given in Geltman (1986). This species has completely glabrous leaf blades with neither stinging nor simple hairs; some scattered stinging and simple hairs are located on the nodes of stems and on the inflorescence axis. It grows in meadows and *Salix*-carrs in river valleys, near streams, in damp forests, etc. Like *U. galeopsifolia*, it is a diploid ( $2n = 26$ ).

*U. galeopsifolia* was likely to be formed at least by the Pliocene period and might have penetrated to the British Isles at the time of existence of bridges with the continent. It survived the Pleistocene glaciations not far from the southern limits of the ice front. At the same time *U. sondenii* seems also to exist in the periglacial area, because the first migration of Siberian taiga species to Europe was possible at the end of Miocene, the next ones in the late Pliocene and in the interval between Dnepr and Moscow glaciations (Minyaev 1965)\*. So, *U. galeopsifolia* and *U. sondenii* were likely to have opportunities for hybridisation. Probably, there were no ecological barriers, because the ecological niches of both species are similar.

As a result of hybridisation of diploid *U. galeopsifolia* and *U. sondenii*, a tetraploid 'primary' *U. dioica* could have been formed. These plants may have been very polymorphic in leaf shape and indumentum and had no stinging hairs on the leaf blades. Such 'primary' forms spread in Europe after the last glaciation and may also have appeared in Wicken Fen. Then, derived from these plants, the 'secondary', typical *U. dioica* with stinging hairs on leaf blades developed. The main selective factor might be a pressure from animals, including domestic ones. As Pollard & Briggs (1984b, p. 507) have shown, "grazing by large mammals could act as a strong selective force for higher stinging hair densities in nettles". So, the origin of typical *U. dioica* was, apparently, connected with human activity. "Response to the modification of the habitat by human settlement seems to be indicated by the nettle as early as the time of Mesolithic culture" (Godwin 1975, p. 242).

Intermediate forms between typical *U. dioica* with numerous stinging hairs and *U. galeopsifolia* are, in fact, mostly primary hybrid forms of *U. dioica*, which have survived to the present time.

\*The interval between the Dnepr and Moscow glaciations seems to correspond with the Hoxnian stage (interval between Anglian and Wolstonian ice periods) in Britain.

Because there are no classical allopatric races in this case, I prefer to treat *U. dioica*, *U. galeopsifolia* and *U. sondenii* as separate species in the framework of an *U. dioica* aggregate or 'complex'.

After the most recent glaciation, *U. galeopsifolia* in Britain survived in damp territories, but in historic times it has become almost extinct due to drainage and now seems to be preserved only in protected wetland areas (like Wicken Fen). Forms intermediate between *U. galeopsifolia* and typical *U. dioica* may be found in various seminatural situations.

It is necessary also to mention *U. pubescens* Ledeb., described from the delta of the river Volga (Ledebour 1833). Sometimes this taxon (more frequently at the rank of the variety *U. dioica* var. *pubescens* (Ledeb.) Trautv.) has been recorded from various regions of Europe. In my opinion, this taxon is a separate species, closely related to *U. galeopsifolia*, but differing from it in some minor characters (Geltman 1986). *U. pubescens* occurs in special wetland territories, mainly in the Volga delta, and recently has been found in lower Dnepr. It may be a relict, which survived in such localities from Tethyan times.

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