

Any bryologist studying a genus over a long period of time will come to recognize one or two species as their favourites – those that stand out because of their particular habit, habitat, distribution or rarity. For **Henk Greven** the genus in question is *Grimmia*, and of the 96 species in this genus (www.grimmiasoftheworld.com), *Grimmia crinita* is just such a favourite.



Ecology and distribution

Plants of *Grimmia crinita* form flat, conspicuously hoary mats that are only a few millimetres high. Dixon (1924) described the habit as striking: ‘it forms extensive velvety patches, resembling a mouse-skin in appearance’. All leaves display the same symmetry and are shaped like boats with rounded keels, with prominent hairpoints at the apex that are flattened and decurrent at the base. In the perichaetial leaves, the entire apex is whitish and pellucid (Figs 1 & 2).

At the base, the leaves are conspicuously narrowed, with translucent, rectangular, thin-walled cells. The leaf margins are flat, and the areolation is one layer thick. Capsules on arcuate setae are produced abundantly in the spring.

Habitat

G. crinita inhabits basic, barren substrates in sunny positions. However, the species is not present in the alpine Dolomites and it is

evidently a lowland species. In Europe, there is a lot of chalk, marl and limestone, and the species could be expected to occur on such rocks but, with a few exceptions, it is absent from such sites. Maier (2002) remarked that, in Europe, *G. crinita* grows exclusively on the vertical side of mortar-covered concrete walls in vineyard regions. A more natural habitat was described by Greven (1995): in 1990, the species was encountered on basic sandstone near the River Ebro in Caspe, Province of Zaragoza, Spain. In this habitat, the species was accompanied by *G. orbicularis* and *G. tergestina*, two comparable sun-lovers on basic substratum.

Distribution of *G. crinita* in England and in The Netherlands

In Britain, *G. crinita* was discovered in 1872 by J.E. Bagnall. He found a small patch on an old, lime-plastered wall of a bridge in Hatton, Warwickshire. Smith (1978) noted: ‘it was probably introduced, now extinct’. Hill *et al.*

of *Grimmia crinita* Brid.

(1992) wrote that the herbarium sample was only small, and that the species was now extinct. However, in 1999, a new site was discovered on a mortar-covered wall in Cornwall (Smith, 2004).

Its occurrence in The Netherlands is just as puzzling as in Britain. The species was collected in 1825 by Franquet at St Pietersberg near Maastricht. After more than a century, in 1984, the Dutch bryologist Bouman discovered a small sample on an old mortar-covered wall at the Fransche Berg (Veluwe, Province of Gelderland). It is clear that *G. crinita* is able to settle in England as well as in The Netherlands. However, why is this species so rare in both countries? In an attempt to find an answer, I started an investigation into the ecology and habitat of the species.

Research

From 1990 on, every 4–5 years, I collected pieces of sandstone, covered with *G. crinita* from a family property along the River Ebro

▲ Fig. 1 (left). *G. crinita* with broadly flattened, whitish hair points on perichaetial leaves, and capsules on short, arcuate setae. H.C. Greven

▲ Fig. 2 (right). *G. crinita* sporophyte with a mature capsule. H.C. Greven

in Caspe, Spain. In my hometown of Doorn I positioned these on a sunny, south-facing table and a roof gutter. I observed the plants carefully and discovered a repetitive pattern. The plants survived the winter well and produced good sporophytes in spring (Fig. 2). During the second year, the vegetation declined due to competition from other bryophyte species that were more suited to the habitat, algae appeared, and finally the *G. crinita* plants faded and died off after 5–6 years.

It turns out that in humid climates, *G. crinita* is a rare pioneer that dies off slowly from the second year on. On sandstone boulders along the river Ebro in Spain, it is a permanent species. Clearly, it is warmer there, but more



▲ Fig. 3. Piece of sandstone with a rich patch of *G. crinita* vegetation, collected in May 2010 in Caspe, Spain (top) and production of young sporophytes in September 2010 (bottom). H.C. Greven

importantly it is too dry for competitors such as *Bryum* and *Ceratodon* species and algae. As the required habitat is present in large amounts, the species can settle on various boulders, allowing continuous growth. From my research, I conclude that in Britain and in The Netherlands *G. crinita* may occasionally settle and grow on old, mortar-covered walls and roofs. However, after a few years the plants disappear, usually before they have been detected by bryologists. In May 2010, a piece of sandstone with a rich growth of *G. crinita* was transported from Caspe to Doorn. The transplant was placed on a south-facing garden bench. After a very humid August, young sporophytes were produced in September (Fig. 3). At the same time, I revisited the original locality in Spain, but there I was not able to detect young sporophytes. So it seems that a humid summer can accelerate the production of sporophytes by 4–5 months.

Ecology

G. crinita grows on sunny, basic substrates exclusively, but not on limestone (too hard) or marl (too soft). Over the past 20 years, I have found *G. crinita* regularly, but never on these substrates. The species has a high habitat demand – it must be basic, dry and sunny, but the substrate must not be too hard or too soft, and it must weather easily.

Lime cement, used as a render on walls and bridge railings for example (Fig. 4), provides a dusty and granular substrate after a long period of weathering in which spores can germinate and produce gametophytes and sporophytes. However, before the substrate meets the growth requirements of *G. crinita*, tens of years need to have passed. In 1989, I inventoried the bunkers along the so-called ‘Dutch Waterline’ between Amsterdam and Rotterdam. These consist of a series about 200 lime-rendered walls built



◀ Fig. 4. *G. crinita* on weathered mortar on banisters of the Hotel du Parc, St Nectaire, Puy-de-Dôme, France (April 1995). H.C. Greven

in 1939. *G. crinita* was not encountered, even though *G. tergestina*, *G. orbicularis* and *G. ovalis* were present (Greven, 1992).

Distribution

The warmth- and weathered-mortar-loving *G. crinita* does not occur in the far north of Europe. Limpricht (1890) recorded it in Germany, Austria, Switzerland, Italy and Hungary. The main distribution, however, is in southern Europe (France, Spain and Portugal) and African countries around the Mediterranean. In 1994, *G. crinita* was encountered on the island of Majorca. Here, it was growing abundantly on mortar-covered walls around almond orchards.

G. crinita material investigated

Belgium: Hainaut, Gerpennes, A. Sotiaux 2289; Namur, Vierves, Ph. de Zuttere 18774. **England:** Warwickshire, Hatton, canal bridge, J.E. Bagnall s.n. **France:** Puy-de-Dôme, La Roche-Blanche, 5 km south of Clermont-Ferrand, Greven 3152, 23.04.1995; Puy-de Dôme, St Nectaire, Hotel du Parc, Greven 3148, 24.04.1995; Nîmes, 9 km east of Lunel, Greven 3610, 14.05.1996; Dep. Hérault, Palavas-les-Flots, south of Montpellier, Touw & Kroes s.n.; Chatonat, along D52, Greven 3150, 23.04.1995; Pyrenees, east side of Prades, Greven 3149, 24.04.1995; Charente Maritime, St Pierre d’Oléron, La Menounière, Sotiaux 15347; Côtes d’Or, Châteauneuf, church wall, Ph. de Zuttere 7676; Hérault, Palavas-les-Flots Touw & Kroes s.n. **The Netherlands:** Zuid Limburg, St Pietersberg, Franquinet s.n. L; Veluwe, Fransche Berg, A.C. Bouman s.n. 1984, L. **Spain:** Majorca, Son Bauza, Greven 2820; Majorca, Sa Torre, Greven 2821, 10.05.1994; Majorca, Capocorn, Greven 2822, 10.05.1994; Majorca, Establiments H.C. Greven 2823,

10.05.1994; Majorca, Son Boscana, road between Cabo Blanco and Capocorn, Greven 2822, 08.05.1994; Prov. Zaragoza, Caspe, River Ebro, peninsula La Magdalena, Greven 3156, 29.04.1995; Prov. Zaragoza, Caspe, River Ebro, peninsula La Magdalena, Greven 3156, 3612, 12.05.2000; Prov. Zaragoza, Caspe, Ceiton, Greven 2046-2050, 3151, 09.05.1990, 29.04.1995, 30.04.2010 and 25.09.2010; El Tablazo, Tabernos, J. Guerra s.n.; Huesca, Martes Berdun, Wallace s.n.; Syria: Jebel Abd-el-Aziz, west of El-Hasseke, alt. 600 m., leg. Kürschner no. 7215, 15.08.1983.

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