The presence of *Segestria florentina* (Rossi) in the Netherlands

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At an earlier occasion, at the Rennes Congress in 1987, I presented a survey of the available data on the distribution of two species of Segestria, viz. S. florentina (ROSSI) and S. bavarica C.L. KOCH, in northwestern Europe (fig. 1) (VAN HELSDINGEN, 1988). S. bavarica appeared to be a Central-European species with the northern limit of its distribution crossing The Netherlands roughly together with the rivers Rhine and Maas (Meuse). This boundary runs more or less straight eastward through Germany and Poland. Consequently we call two records from the Danish island Bornholm and the Swedish island Hisingen near Göteborg isolated populations, or proof of a further occurrence along the Baltic coasts. In the meantime I have found a small population of bavarica on one of the so-called Frisian Islands (Vlieland) in the North of The Netherlands, which suggests a further distribution along the North Sea Coast. On the British Isles S. bavarica is restricted to a number of towns along the south-coast and London.

S. florentina, the larger species with the shiny metal-green chelicerae, has a comparable distribution in England. It has been found in the province of Zeeland in The Netherlands, but otherwise is restricted to the Atlantic coast of France (South of Normandy) and the Iberian Peninsula, and the mediterranean region as far East as the Krim in the U.S.S.R. Two old records (BECKER, 1896: 312) from ruins in the

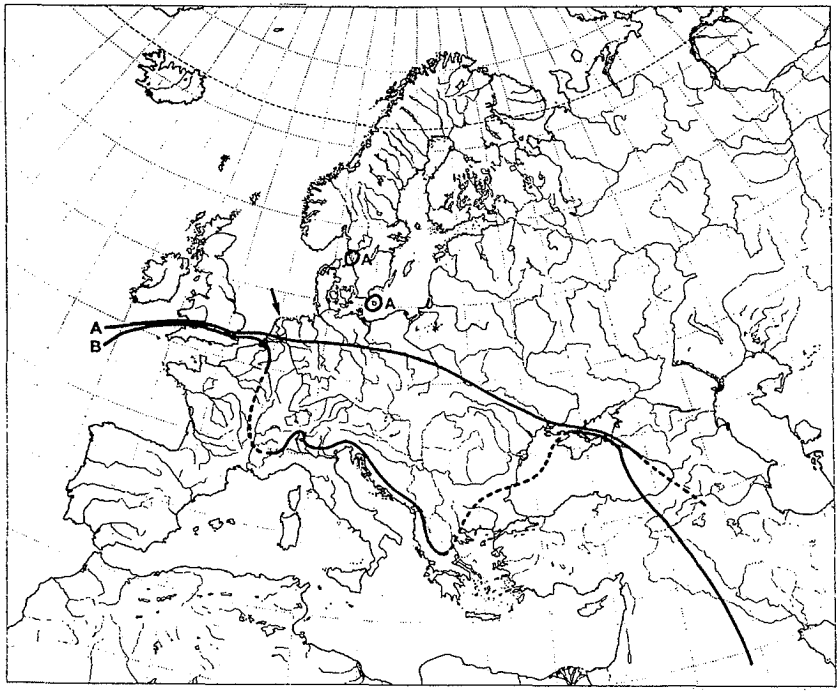
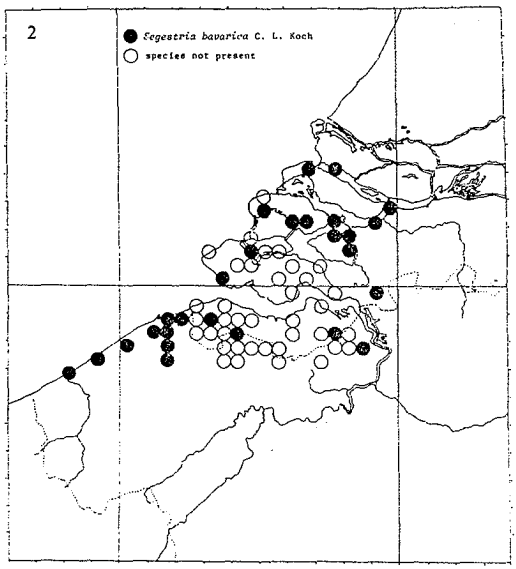


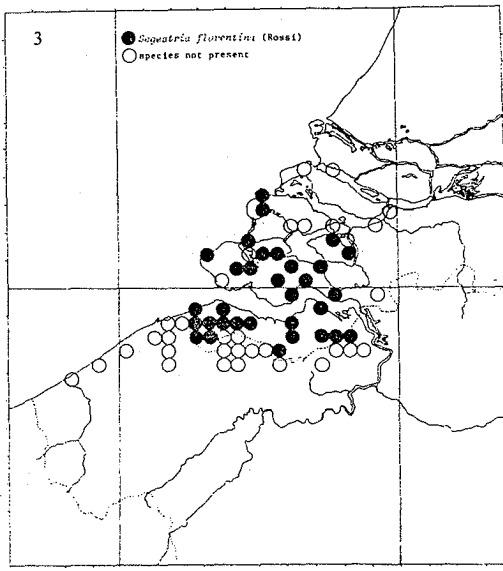
Fig. 1. Northern limits of distributions of Segestria bavarica (A) and S. florentina (B); isolated (?) populations of bavarica on Bornholm, Hisingen and Vlieland (arrow) indicated.

southern part of Belgium far from the coastal region have never been confirmed since. On my way to Paris (July 1990) to read this paper, I visited both old Becker's sites, the Abbaye de Villers (ruine) and the Chateau de Poilvache (ruine). Neither had any bavarica or florentina on its walls, which doesn't proof anything because the ruins had been restored. This may have destroyed the populations if they really have existed.

In 1987 I challenged our Belgian colleagues to establish the continuation of the Dutch population of the province of Zeeland in their country. S. florentina should occur there along the coast. I have received no news and have not seen any records in the literature. However, I did not merely sit at my desk and wait. During the past years I attempted to investigate the province of Zeeland in more detail and to establish the boundaries of this florentina population. The results are still more or less provisional, but a general pattern begins to unfold. The presently known distributions are presented in figs. 2 and 3.

The survey has been carried out rather superficially because I wanted results without too heavy an investment in time. A village or town of distributional importance, and sometimes an isolated castle or wind-mill, was investigated on the presence of Segestria by searching the walls of churches, town halls or town-gates in the first place, but also of houses, walls around gardens and graveyards, or any other available construction. When the presence of a population of a Segestria species had been established and a few specimens taken from one or two buildings for documentation the locality was considered inventoried. In most villages only one species was found to be present, which is an empirical result. I never tried very hard to find the other species or make sure that nowhere at that locality the other species had established itself. Only in few cases I found both bavarica and florentina present, in one instance even on the same wall. The rule, therefore, is that a village or town is occupied by either florentina





Figs. 2, 3. Results of present investigations for Segestria bavarica (2) and S. florentina (3) in The Netherlands and the western part of Belgium.

or bavarica.

Throughout Zeeland either species is well-represented, although florentina holds the larger number of localities. Going south, we come to the region of Zeeuwsch-Vlaanderen, the Dutch part of Flanders and the mainland section of Zeeland - all other parts being, or formerly being islands. Only twice bavarica has been found there, while florentina is common at every village visited. Then comes the anticlimax: wherever one crosses the border to the Belgian part of Flanders florentina is absent - with one exception: a single wandering male was found in Kieldrecht (May, 1990). At many villages one can find only bavarica, others have nothing at all. It is annoying and irritating, or unexpected and interesting, depending on your intellectual attitude. Whatever ones reaction is, it is certainly difficult to explain.

What determines the extent of a distribution range of a species, or, in the case of florentina, of a population? S. florentina was present in Zeeland, on the island of Walcheren in 1885, according to VAN HASSELT (1885: 122), which is a verifiable record. Only in the last decade when I revisited some of VAN HASSELT sites for records of rare species the occurrence there was confirmed. VAN HASSELT'S collection holds two specimens, which must have come from the one locality (Walcheren) he ever mentioned. We don't know where on Walcheren it was found and how common it was, and we also don't have any early records from other parts of the province of Zeeland.

The former range then is not known, but the habitat was there and the species has maintained itself. S. florentina is synanthropic and depends on the availability of hiding places where it can build its funnel and its web, which consists of a few threads around the entrance of the funnel. Houses, walls and fences provide plenty of holes and cracks, which replace the fissures in rocks, which I consider the original, natural habitat of this spider. A suitable climate, availability of food and a balance with enemies determine the long-term fate of the population and its boundaries.

To begin with the last factor, we know of only one group of predators, the Pompilidae or Spider-wasps, two species of which are reported to show special, though not exclusive, interest in Segestria (DAY, 1989). Both are known from Zeeland, but nothing is known about densities. Theoretically the numbers of prey and predator should be in balance. As regards food, Segestria species are no specialists, but take anything that touches their snares, if not too large, too hard, or too powerful in defence. One finds wings of tipulids and other Diptera, armours of isopods and pincers of earwigs as remains of their meals. All these organisms are abundantly present, but the availability as food is also related to the activities of the prey-animals, which at some time or other should touch one of the snares around the entrance. This then brings us to the climate which regulates the period and degree of activity of the different prey species, but of course also constitutes a condition for the spiders themselves.

In zoogeography climate often is the main factor which determines the limits of a range of distribution. Temperature, precipitation and day-length, all have their (interrelated) influence on the viability of a population of a certain species. Empirically one finds the limits of the range of distribution, but the factors which cause the limits can only be established experimentally. Here we will only speculate on the main influences.

On an animal with a concealed way of living, in walls of buildings, wind probably has no direct influence. Wind is not extreme in The Netherlands, although it often carries a lot of moisture.

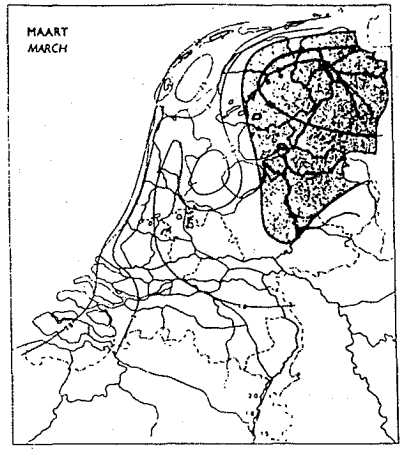


Fig. 4. The 2.5° and 2.0° C isotherms for the Mean Daily Minimum Temperature (NDMT) for the month of March in The Netherlands.

Rainfall is not extreme either and rather evenly distributed throughout the year. The most simple assumption is that temperature determines the unsuitability of a site for S. florentina, either directly by dropping so low for such an extent of time that the animal itself cannot stand it, or indirectly by staying so low that all prey animals stop their activities. Indeed, the climate in the province of Zeeland is noticeably milder than in other parts of the country. The mean daily minimum temperature (MDMT) during the winter months in the whole province is higher than elsewhere in the country. The influence of the relatively warm sea reaches much further inland, presumably because of the broad estuarine network of the mouths of the rivers Rhine, Meuse and Scheldt. The MDMT isotherm of 2°C in March, as an example (fig. 4), curves around Zeeland, which means that to the west it is warmer and to the east colder. To my regret it is impossible to obtain comparable information for the adjacent parts of Belgium. I expect the MDMT isotherm of 2°C to run westward just south of the Dutch-Belgian border and run in a southwestern direction along the coast.

Even if this would be the case, it is impossible to understand how the national border between two countries can form so sharp a limit to the distribution range of the spider species S. florentina. In the flat Flemish countryside the national border is certainly not a natural border and the isotherms will certainly not follow the national border exactly. Still every village or town in Belgium has bavarica on its buildings, or senoculata, or nothing, but never florentina. This even is the case in villages close to each other at either side of the border, where florentina can be found in the Dutch village but not across the border.

Something else then must cause the absence of florentina in Belgium. My present hypothesis is that differences in construction of the buildings play an important rôle. For the old churches in Zeeland hand-made bricks were used jointed with shell-lime mortar. The bricks are irregular and often have holes in them. The mortar frequently fails at places either through erosion or because the bricklayer did not aim at completely filling up the joints. Wide, metal rain-pipes come down from the roof and are held close to the walls by broad metal braces. This gives plenty of possibilities to build funnels in the holes, in open joints and between rain-pipes and the wall. Cracks in the walls,

door-frame and an unused door add to the possibilities of the development and maintenance of a viable population. My physical possibilities do not surpass a height of 2.5 metres, but I have been informed of the presence of many funnels on a slate roof and along the gutters of a castle. The church and the houses around the church in a typical Zeeland village often offer the same, raised habitat.

In the adjacent part of Belgium the churches are often of stone. The stones have even surfaces without holes and usually fit close together with narrow joints, which leave not much space for funnels. Moreover, the rain-pipes run down at a larger distance from the walls. Such a building offers too few hiding-places for Segestria to maintain a population of viable size. If clefts are present, they are too narrow for the larger florentina and are occupied by bavarica, but quite often one can find only few specimens or none at all. Churches and other buildings in Zeeland often house dense populations. The quality of the available habitat is certainly an important factor.

Probably both climate and suitability of the habitat play a rôle and together determine the extent and limits of the range of distribution of S. florentina.

References

BECKER, L., 1896. Les Arachnides de Belgiques (3). -- Annales du Musée Royal d'Histoire Naturelle de Belgique, 12 (2): 1-378, pls. 1-18.

DAY, M.C., 1988. Spider wasps. Hymenoptera: Pompilidae. -- Handbooks for the Identification of British Insects, 6(4): 1-60. -- London.

HASSELT, A.W.M. VAN, 1885. Catalogus Aranearum, hucusque in Hollandia inventarum. -- Tijdschrift voor Entomologie, 28: 113-188.

HELSDINGEN, P.J. VAN, 1988. Note provisoire sur la répartition des espèces du genre Segestria aux Pays-Bas (Aranceae, Segestridae). -- Bulletin de la Société Scientifique de Bretagne, Rennes, 59 (hors série 1): 91-98.