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A new and extensive population of *Stuckenia* × *suecica* in the River Suir, S.E. Ireland

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Abstract
We describe the distribution and habitat of a newly-discovered population of *Stukenia* × *suecica* (K. Richt.) Holub, the hybrid between *S. pectinata* (L.) Börner and *S. filiformis* (Pers.) Börner, encompassing a 60km stretch of the River Suir in South Tipperary (v.c.H7), Ireland. As in Yorkshire, the hybrid here is outside the geographical range of its rarer parent, *S. filiformis*.

Keywords: *Potamogeton*; pondweed; hybrid.

Introduction

The pondweed species which until recently have been treated as *Potamogeton* subgenus *Coleogeton* are now often placed in a separate genus, *Stuckenia*. This treatment was recommended by Kaplan (2008) and followed by Stace (2019) in the latest edition of his *New Flora*. Although name changes are a nuisance, the new treatment makes good sense both because of clear morphological differences between the two genera and because there are numerous hybrids within the more narrowly defined genera but none is known between them. The two British and Irish species of *Stuckenia*, the widespread *S. pectinata* (L.) Börner and the more northerly and westerly *S. filiformis* (Pers.) Börner, are amongst those that hybridise. In Britain their hybrid, *S.* × *suecica* (K. Richt.) Holub, occurs not only within the range of the parents in Scotland but also as long-established populations in the Rivers Ure and Wharfe in Yorkshire, over 100 km south of the closest known site for *S. filiformis* (Preston *et al.*, 1999; Stace *et al.*, 2015). In Ireland *S.* × *suecica* was not discovered until 1989 and it has hitherto been recorded at a few sites within the range of *S. filiformis* in the west. In this paper we provide details of a newly discovered and remarkably extensive population of this hybrid in the River Suir. This population lies about 100 km south-east of the nearest known *S. filiformis* and its presence in the river provides a parallel to the occurrence of hybrid populations in the Yorkshire rivers in Britain.

The presence of *S.* × *suecica* in the Suir first came to light when CDP examined flowering specimens of *Stuckenia* collected by RF in August 2018 at two sites in S. Tipperary (v.c.H7), Golden (S0138) and Newcastle (S1213). Although these specimens superficially resembled *S. pectinata*, their closed leaf sheaths and sessile carpels ruled out this species and indicated that they were *S.* × *suecica*. The presence of the hybrid at two well-separated sites suggested that there might be an

extensive population in the river, and on 7–8 August 2019 we visited a series of sites along the river and found that this is indeed the case. Voucher material has been deposited in **CGE** and **DBN**.

Distribution and habitat in the Suir

The River Suir is the third longest river in Ireland (184 km), much shorter than the Shannon (360 km) but not much shorter than its sister river the Barrow (192 km) to the east. It rises in the Devilsbit Mountain near Templemore, N. Tipperary (v.c.H10), soon enters S. Tipperary then flows southwards through Thurles, past Cashel and then through Caher before it comes against the hills running west-east along the Tipperary-Waterford boundary. Faced with this upland ridge the river loops north then east through Clonmel, Carrick-on-Suir and Waterford until the point where it joins the Barrow and reaches the sea at Waterford Harbour. The east-flowing stretch forms the boundary between S. Tipperary and Waterford, then Kilkenny and Waterford. For much of its length, from Thurles to the sea, the Suir and its tributaries constitute a Special Area of Conservation (designated under the EU Habitats Directive), the Lower River Suir SAC. It qualifies as such for a number of habitat features including its aquatic vegetation and fringing tall-herb communities. The species this SAC aims to protect include mammals (otter), fish (salmon and three species of lamprey) and invertebrates (white-clawed crayfish, freshwater pearl mussel).

In August 2019 we visited sites along the middle stretches of the river from Holycross, S. of Thurles, along the south-flowing stretch and the southerly loop up to the start of the east-flowing stretch at Knocklofty. The sites were almost all alongside bridges, as this was the most efficient way of surveying the river, and fortunately it was possible to find at least one suitable bridge in all seven hectads through which the river flows between Holycross and Knocklofty. All the sites we visited are within the SAC. Our survey was a rapid one and our aim was to cover as much of the river as possible rather than to carry out very detailed studies at individual sites. We were favoured by the water levels, which appeared to be low, and by two fairly bright days which provided conditions in which the aquatic plants growing in the clear water of the Suir were clearly visible.

At the most upstream site we visited, at Holycross (S0954), the river is shallow, stony and the main emergent species growing along the edge is *Phalaris arundinacea*. We found no *Stuckenia* × *suecica* in the river and the adjoining mill stream. Our next site downstream was Twoford Bridges (S0751) where, as the name suggests, the river consists of two shallow branches, each crossed by a bridge. The eastern branch was particularly shallow and dominated by algae; in the western branch we found a single stem of *S.* × *suecica* growing in water 30–35 cm deep amongst calcium-encrusted stones. The presence of this one rooted stem perhaps indicates that there are larger patches of the hybrid nearby.

At the next three sites downstream, bridges at Ardmayle (S0545), Camus Bridge (S0443) and Golden (S0138), the river is shallow and dominated by large stands of *Schoenoplectus lacustris*, which is present as some patches with just submersed leaves as well as others with the more familiar tall emergent stems (Figs. 1, 2). At all three sites there were large stands of flowering *S.* × *suecica* growing in water 20–40 cm deep, and possibly deeper, rooted in the stony substrate of the river. It grew in rather pure beds with few associates intermixed, although at both

Camus Bridge and Golden these were accompanied by the hybrid *P. × nitens* (*P. gramineus* × *perfoliatus*), also growing in the absence of both parents.

Figure 1. R. Suir at Golden, with large stands of *S.* × *suecica* in the foreground and *Schoenoplectus lacustris* (submerged leaves only) in the background.

Figure 2. R. Suir at Camus Bridge, where *S.* × *suecica* grows in a stretch of river dominated by emergent stands of *Schoenoplectus lacustris*.

Further downstream, as the river deepened and broadened, *S.* × *suecica* became increasingly restricted to shallower stretches of the watercourse with more stony substrates than the main channel. Below Caher, at Swiss Cottage (S0522), the beds of *Schoenoplectus* are found along the banks of the broader and deeper channel. We found large beds of *S.* × *suecica* on the E. side, growing in stony shallows where the flow of the water was reduced by the dense beds of *Schoenoplectus* immediately upstream. These grew with *Lemna minor*, *L. trisulca*, *Ranunculus* sp., *Spirodela polyrhiza* and *Fontinalis antipyretica*. At Ardfinnan we could find no pondweeds in the broad northerly channel of the river, but a shallower branch to the south had large beds of *S.* × *suecica* in water 40 cm deep over limestone stones (Fig. 3), intermixed in places with beds of *Ranunculus penicillatus* subsp. *penicillatus*. The hybrid also grew in a stream which enters this branch of the river here, in water which in places was only 10 cm deep, accompanied by *P. perfoliatus*, *Myriophyllum spicatum*, *Ranunculus* sp. and (on slightly raised small stony mounds in the stream) *Berula erecta* (Fig. 4). Further downstream, at Newcastle Bridge (S1313), *S.* × *suecica* grew in water about 40 cm deep at the edge of an area of shoals and river shingle dominated by *Phalaris arundinacea*, with a few more non-flowering plants in a stagnant pond over the river shingle here.

Figure 3. *S.* × *suecica* growing with *Ranunculus* in the S. branch of the R. Suir at Ardfinnan.

Figure 4. Stream flowing into the R. Suir at Ardfinnan, which supports stands of *Potamogeton perfoliatus* and *S.* × *suecica*.

The restriction of the hybrid to shallower water was most strikingly apparent at the most downstream locality we visited, at Knocklofty (S1420), where the river is the boundary between S. Tipperary and Waterford (v.c.H6). Upstream of the bridge the river is broad, smoothly flowing and tree-lined, with beds of *Potamogeton* × *angustifolius* (*P. gramineus* × *lucens*) and *P.* × *nitens* growing beyond the muddy margin on the Waterford side. However on the Tipperary side of the river downstream of the bridge the river breaks into shallows and there is a flowering stand of *S.* × *suecica* in water 5–20 cm deep (Fig. 5).

Morphology

We were able to collect and examine material from all the populations described above. The plants were relatively uniform (Table 1). The robust, branched stems were unlike those of *S. filiformis*, but the plants differed from *S. pectinata* in having sheaths which were usually closed and tubular at the base (Fig. 6), leaves with an acute rather than a finely acuminate apex and stigmas which were consistently sessile, rather than separated from the body of the carpel by a stylar neck (Fig. 7). The tubular sheaths also distinguish the hybrid from *S.* × *bottnica* (*S. pectinata* × *vaginata*), which is known from the River Liffey to the north.

Figure 5. The R. Suir at Knocklofty. The river upstream of the bridge (top) has flowering stands of *Potamogeton* × *angustifolius* but no *S.* × *suecica* whereas downstream of the bridge (bottom) *S.* × *suecica* grows in the stony shallows.

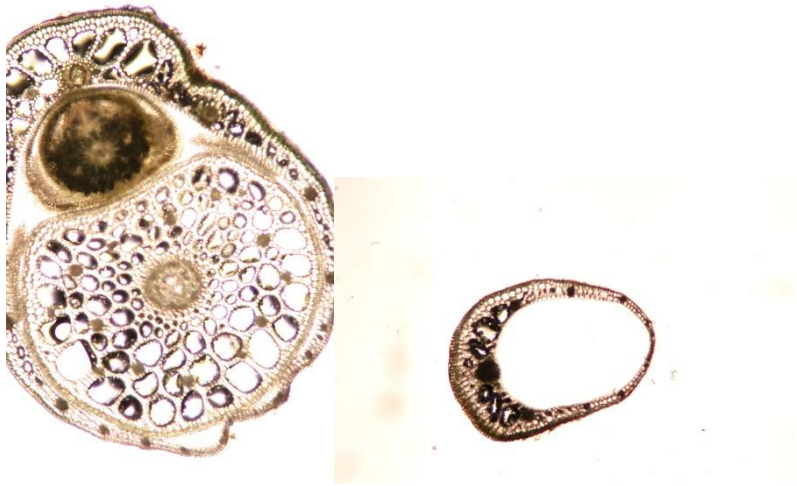

Figure 6. Cross-section of stem and surrounding tubular sheath of *S. × suecica* from Ardmayle (left) and of an empty sheath from Golden (right).

Figure 7. Carpel of *S.* × *suecica* from Ardmayle showing the sessile stigma (left) compared witha carpel of *S. pectinata* collected from a coastal pond at Ferrybank, Arklow, by C. Brady & S. Reynolds on 8 August 2019 (right).

Table 1. Localities where *S.* × *suecica* was seen in the River Suir, 7–8 August 2019, with the number of closed and open sheaths examined and the nature of the stigma. Although only young sheaths were examined, some of those recorded as open may have been closed sheaths which split before dissection.

Locality	Grid reference	Closed sheaths	Open sheaths	Stigmas
Twoford Bridges	S070516	3	2	not flowering
Ardmayle Bridge	S052459	13	4	± sessile
Camus Bridge	S046431	10	3	sessile
Golden	S011383	18	2	sessile
Swiss Cottage	S054227	17	1	sessile
Ardfinnan (river)	S081175	12	0	sessile
Ardfinnan (stream)	S080176	11	1	sessile
Newcastle Bridge	S130136	15	1	sessile
Knocklofty Bridge	S143206	12	0	± sessile

Populations of *S.* × *suecica* differ in their mixture of parental characters (Preston *et al.,* 1998). The Suir population is clearly one which has predominantly tubular sheaths (rather than a mixture of closed and open sheaths) and consistently sessile (rather than stalked) stigmas.

Discussion

The newly discovered population of *S.* × *suecica* in the Suir extends for at least 60 km of the river from Twoford Bridges downstream to Knocklofty in S. Tipperary. This clearly adds a further feature to the biological interest of the SAC, as well as another significant European population of a *Stuckenia* hybrid outside the range of the rarer parent. A more detailed survey of the full length of the river will be needed to establish just how frequent it is between these points. We found it by all the bridges we examined in this long stretch, but the habitat might be especially suitable for *S.* × *suecica* in the vicinity of bridges, especially in the lower, wider and deeper stretches of the river, as bridges presumably tend to be built in places where the water is shallowest. In all its sites the hybrid apparently occurs not only in the absence of *S. filiformis* but also of its more frequent parent, *S. pectinata*. We saw no sign of this in the river, though we did confirm its presence as fruiting plants in Rockwell Lake, S0634, an ornamental lake some 5 km N.W. of the river between Golden and Swiss Cottage.

The aquatic plants of the Suir have not previously been investigated very thoroughly. J.E. Dandy's card index (BM) provides an invaluable record of the specimens of *Potamogeton* he examined, and includes details of three specimens of *P. pectinatus* from the River Suir in S. Tipperary, one from Camus Bridge, where it was collected by R.J. Pankhurst in 1975 (**BM**), and two specimens in **DBN,** near Clonmel (D. Moore, undated) and below Clonmel (R.M. Barrington, 1876). Camus Bridge is one of the sites where we found *S.* × *suecica* whereas Clonmel is some 6 km downstream of Knocklofty. It would clearly be worth checking these specimens, but unfortunately we have been unable to find any of them in an initial search in these herbaria.

The other question raised by our observations this year is how much further downstream the hybrid extends in the Suir. We hope to have an opportunity to investigate this in the future.

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