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Symphytum caucasicum x *S. orientale* (Boraginaceae) in East Norfolk and Isle of Wight

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Abstract
A hybrid between *Symphytum caucasicum* and *Symphytum orientale* is described from two sites in Norfolk, and one on the Isle of Wight. The taxon seems to be a new one, certainly for the British Isles and Ireland, and is similar to two previously described hybrids from Norfolk, *Symphytum* x *norvicense* (*S. asperum* x *orientale*) and *Symphytum* x *uplandicum* x *caucasicum*. Separation of these three taxa is discussed: all three are characterised by a combination of variegated red, blue, purple or white corolla bell, together with a calyx dissection to less than half way. This shallowly dissected calyx is the key to recognition of these three entities, which otherwise are easily overlooked as diminutive forms of *Symphytum* x *uplandicum*

Keywords
Hybrid, segregate, *Symphytum* x *uplandicum*, *Symphytum* x *norvicense.*

Introduction

In 2014 I reported on a hybrid comfrey from East Norfolk which appeared to me to have the parentage *Symphytum* x *uplandicum* x *caucasicum* (Leaney, 2014). This determination was confirmed by Clare O'Reilly, my predecessor as Botanical Society of Britain and Ireland (BSBI) *Symphytum* referee, and subsequently included in the Hybrid Flora of the British Isles (Stace *et al.*, 2015). This plant, still persisting on a road verge at Bergh Apton, had flowers very much like *caucasicum*, with a short, intensely mid-blue, widely flared corolla bell and a purplish, shallowly dissected calyx completely covering the corolla tube. However, there were deep purple longitudinal striations down each corolla lobe never found in pure *caucasicum*, together with a stature, habit and leaf shape close to *S.* x *uplandicum*.

Two further hybrid comfrey plants have now been found in East Norfolk showing very similar *S. caucasicum* floral characters to the Bergh Apton plant, but in this case much more low-growing and with white in the open corolla. One plant, found in a Norwich churchyard in 2015, arose in a large patch of *S. orientale*, providing good circumstantial evidence that *S. orientale* was the other parent. The second plant, found on a road verge at Swainsthorpe in 2016, without putative parents, combined much the same floral characters but this time with broadly ovate and softly hairy upper stem leaves, again suggesting *S. orientale* as the other parent.

These two plants would seem almost certainly to be nothomorphs of *Symphytum caucasicum* x *S. orientale*. The churchyard plant, from the manner of its origin, must be a F_1 hybrid with *S. orientale* as the ovule parent. The road verge plant, however, is a much more bizarre entity with uniquely woolly leaves and a strikingly parti-coloured corolla. It is likely to be a F_2 segregate, and there is good evidence that it arose in cultivation, as described below. Although there is much white in the just opened corolla of both nothomorphs, the mature open corolla bell in both cases tends to turn to a mid-blue background colour very similar to the mid-blue open corolla colour of *S. caucasicum*.

The Norwich hybrid

This plant was first found in St. Giles' churchyard, central Norwich, in mid May 2015 (TG 22590862). On the year of discovery it occupied about three quarters of a 2.5 x 1 metre patch of *S. orientale*, standing out because of its pale blueish flowers (Fig. 1). By May 2018 it had spread further into the *S. orientale* and had overtopped it with a height of *c.*80 cms. Material taken in 2018 has been deposited in the Norwich Castle Museum herbarium (**NWH**).

Habit was basically much as in *S. orientale*, with fairly long internodes and quite an open structure, and with the upper and mid stem leaves held in a roughly horizontal posture (not "swept up" as in *S.* x *uplandicum*, or in the Bergh Apton *S.* x *uplandicum* x *caucasicum* hybrid). However, the leaves were more narrowly ovate, more sparsely hairy, and with a noticeably indented venation on the upper surface, features consistent with a *caucasicum* element (Fig. 1). Even more suggestive of *caucasicum* were the short, broadly winged petioles on the upper leaves, with a very constant petiole wing decurrence of 1.0 -1.5 (2.0) cms. (Fig. 1). This feature is near diagnostic for *S. caucasicum*.

Figure 1. *Symphytum caucasicum* x *orientale*, St Giles' churchyard, Norwich, v.c. 27, mid-May 2015. Narrowly ovate upper stem leaves (left); short petiole wing decurrence (right)

The corolla was strikingly short with an especially short, strongly flared bell and the tube entirely covered by the calyx. Overall detached corolla length was (14.0) 14.5 -16.0 (16.5) x 15 in the fresh state – between the corolla length of *S.*

caucasicum and *S. orientale*, but nearer the former. Flower colour began as orange red with deep red striations in bud; the newly opened corolla bell pinkish white with pink-purple striations; the fully opened bell with a pale blue then mid blue background colour, and deep purple to violet purple striations. The detached corolla always had a completely white tube (Figs. 2 & 3).

Figure 2. *Symphytum caucasicum* x *orientale*, St Giles' churchyard, Norwich, v.c. 27, mid-May 2015. Habit, stature, leaf shape and flower colour (*Symphytum orientale* to left).

The calyx covered the whole corolla tube and was proportionally long, around half the length of the corolla, shallowly dissected to ⅓ - (⅖) and with some purple in the veins – all characters found in *S. caucasicum*. Calyx length was 6.5 – 8.0 x 15; the calyx lobes were triangular with (subacute -) obtuse to rounded tips (Fig. 3).

Figure 3. Bluish-white corolla and 1/3 dissected, purple tinged calyx of *Symphytum caucasicum* x *orientale*, St Giles' churchyard, Norwich, v.c. 27, mid-May 2015.

The indumentum of the leaves was sparse with long, weak, simple bristles above and below. The stem indumentum was also sparse, with short to medium long bristles (many minutely uncinate), and profuse, fine uncinate hairs, very minute and only visible under a microscope. The calyx and pedicels were densely covered with long, thick, curved and mostly uncinate bristles and the same minute uncinate hairs found on the stem. On the calyx lobes the long stiff bristles were replaced by very long, simple, wispy hairs.

The Swainsthorpe hybrid

In May of 2016 Bob Ellis, BSBI County Recorder for East Norfolk (v.c.27), brought my attention to an unusual blue and purple flowered comfrey growing on a road verge on Stoke Lane, Swainsthorpe, a few miles south of Norwich (TG 23090164). The population consisted of two clonal patches about 25 metres apart, each patch covering an area of *c.*3 x 1 metre. One patch was 50 – 75 cms high (Fig. 4) and the other only *c.*30 cms high, but the two plants looked identical in all ways apart from stature and habit. Photos were taken from the taller patch, and material from this plant has also been deposited in **NWH**.

As regards habit the taller plant had quite an open structure with erect flowering stems and fairly long internodes, the upper leaves held roughly horizontally, much as in *S. orientale,* and not "swept up" as in *S.* x *uplandicum*. Habit differed from that of *S. caucasicum* in the flowering stems being erect and well separated, rather than decumbent to ascending and tangled together (Fig. 4).

The most striking vegetative feature of both clones was the easily visible woolly hairiness of the leaves and the very broadly ovate, sometimes near orbicular, shape of the upper stem leaves (Fig. 5). These features were very suggestive of *S. orientale*, but were combined with very short, broadly winged petioles on the upper stem leaves, and a few millimetres of petiole wing decurrence down the stem, both constant characters of *S. caucasicum* (Fig. 4).

Figure 4. *Symphytum caucasicum* x *orientale*, Swainsthorpe road verge, v.c. 27, mid-May 2016. Habit, stature and leaf shape (left); very short petiole wing decurrence (right).

Figure 5. *Symphytum caucasicum* x *orientale*, Swainsthorpe road verge, v.c. 27, mid-May 2016. Broadly ovate upper stem leaves.

The corolla was noticeably short, with an especially short, broadly flared bell, with the tube completely covered by the calyx, all much as in *S. caucasicum* (Fig 6). The overall length of the detached corolla in the fresh state was 12.8 – 13.2 mm (x10), which is close to the corolla length found in *S. caucasicum*. Flower colour was quite unlike any comfrey I've encountered, the corolla bell remarkably variegated and showing a variable succession of patterns as it opened: the buds pink red to orange red; the newly opened corolla bell a very pale blueish white (or occasionally pinkish white), with deep purple longitudinal striations, the background colour sometimes changing to mid-blue later; on occasions the open corolla bore very broad and near confluent deep red-purple striations, or was almost completely deep red-purple (Fig. 6).

Figure 6. *Symphytum caucasium* x *orientale*, Swainsthorpe road verge, v.c. 27, mid-May 2016. Corolla variegation with very broad and near confluent deep purple striations (left); roughly 1/3 dissected, purple calyx (right).

The calyx was deeply suffused with purple, proportionally long and more than half the length of the corolla, both features of *S. caucasicum*; overall length (6.8) 7.0 – 8.0 (8.5) mm x15; calyx dissection was ¼ - ⅓ ($^2/_5$), resembling both *S. caucasicum* and *S. orientale*; the calyx lobes were triangular with (subacute) obtuse to rounded tips. The indumentum of the leaves consists of long, very soft hairs, extremely dense on the upper surface, more confined to the veins on the undersurface, and giving the leaves an uniquely woolly appearance and texture. On the stem sparse, weak, simple bristles were mixed with much larger numbers of minute uncinate hairs, only visible with a microscope. The same minute, uncinate hairs were also found on the peduncles and calices, but here mixed with long, curved, thick bristles, many also uncinate. On the calyx lobes these long, rigid bristles were replaced by more flexible, simple hairs of similar length.

While examining these plants I was approached by the owners of a former farmhouse on the other side of the road, who told me that they had numerous comfreys growing in their garden and invited me to have a look. *Symphytum grandiflorum, S. orientale and S. x uplandicum* were all present, along with a single comfrey plant very similar to the two clones on the road verge opposite. This plant had much the same short, variegated corolla, with similar colour combinations, and a very shallowly dissected calyx, but had noticeably less broadly ovate and hairy leaves, showing quite deeply indented venation – *S. caucasicum* characters resembling the Norwich churchyard form already described. This plant had been in the garden 10 years before when they moved in.

It would seem therefore that the wild growing verge plants of *S. caucasicum* x *orientale* were seeded from the hybrid in the garden opposite, this hybrid having been brought to the garden as the hybrid, or having arisen in the garden by crossing between (nursery sourced) *S. caucasicum* and *S. orientale*. The verge plant, with more features of *S. orientale*, could have been the result of backcrossing of the garden hybrid plant with *S. orientale*, or of inbreeding to produce a F_2 segregate

Origin of the hybrid

As has been outlined in the two descriptions, both of these plants show a marked resemblance to *S. caucasicum* in floral characters: a very short corolla with an especially short, flared bell; very shallow calyx dissection to around ⅓ way down, the calyx entirely covering the corolla tube and with a purple tinge, especially in the Swainsthorpe plant; and the fully opened corolla variegated, but often with a mid-blue background colour. These features occur in both plants along with a short decurrence of the upper stem petiole wings, again a *S. caucasicum* feature.

All these *S. caucasicum* characters are accompanied by very broadly ovate and softly hairy upper leaves and much white in the newly opened corolla, both features suggestive of *S. orientale* as the other parent. The very shallow calyx dissection also fits well with *S. orientale* parentage, for this taxon has almost the same dissection as *S. caucasicum*.

Other origins considered

A form of *S. x norvicense* can be ruled out because that taxon has a much longer and less flared corolla bell, with a more exposed corolla tube, together with a less shallowly dissected calyx to nearly half way. It also has much longer upper stem

leaf petioles, with very narrow petiole wings that are not decurrent (O'Reilly & Leaney, 2009; Leaney, 2014.)

S. x *uplandicum* x *caucasicum* is also quite a different looking plant, usually taller like *S.x norvicense*, but this time with very short petioled, 'swept up' leaves, similar to *S*. x *uplandicum*, on the upper stem. The corolla bell is similarly short and flared, but of a very uniform mid-blue colour, with only a fine, well demarcated, deep purple (not red-purple) striation down each lobe (Leaney, 2014).

The question also arises in this situation as to whether plants like these could be newly introduced aliens. It is very difficult to obtain detailed descriptions or images to resolve this dilemma, but a recent study of the phylogeny of the whole genus *Symphytum* using the corolla colours cream, blue, pink, white or yellow for cluster analysis, makes no mention of parti-coloured corollas in pure species (Hacioglu & Erik, 2011). Furthermore, the pure species known in the British Isles (*S. officinale, tuberosum, grandiflorum, orientale*, *bulbosum, caucasicum*) all show unicolourous corollas at the fully opened stage. The present plants show patchy and very variable corolla colours, as found in *S*. x *uplandicum* and *S. x hidcotense*, together with the longitudinal, deep purple striations of the sort found in *S. x norvicense* and especially in *S. uplandicum x caucasicum*. For these reasons I feel that the two plants are hybrids and not newly introduced pure species.

The possibility of species other than *S. caucasicum* and *orientale* being involved in hybridisation also has to be considered. There are three other species with white, blue or red corollas and a very shallowly dissected calyx: *S. brachycalyx*, *S. bornmuelleri* and *S. kurdicum* (Bucknall, 1913; Hacioglu & Erik, 2011). Hybridisation between these taxa could give the requisite flower colour and calyx dissection, but all have restricted ranges in Turkey, Kurdistan and the Middle East. Most importantly, none of them are known as horticultural plants in the British Isles and there is no evidence that any of them have been introduced anywhere in Europe (Tutin *et al*., 1972), so it seems highly unlikely that they could be involved.

Conclusion

There seems to be no reasonable doubt that these plants are two nothomorphs of the hybrid *Symphytum caucasium* x *orientale.* A search of the literature and enquiry to the taxonomist with the most recent interest in *Symphytum* has not turned up any evidence that this hybrid has been described before. (Wolfgang Bomble, pers. comm.)

Two other populations which could have the same hybrid origin have been reported to me from the Isle of Wight (Paul Stanley, pers. comm.). Material sent to me from Ventnor in 2014 was very similar to the Norfolk plants, but differed in showing bulbous based bristles on the stem and calyx, suggesting an *asperum* or x *uplandicum* element. Material from Shorwell (SZ 459832) fitted better however, again having a short petiole wing decurrence, a purplish, very shallowly dissected calyx, and a variegated, longitudinally striated corolla bell, with much white in it – but in this case without bulbous based bristles. This population, growing in the wild, was very close to an identical looking population in the garden of Northcourt Hall (SZ451831) where both *S. caucasicum* and *S. orientale* were growing.

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