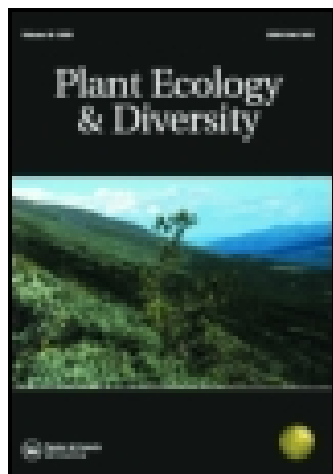


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### XIX.—On the Groups of Triandræ and Fragiles of the Genus Solix

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XIX.—*On the Groups Triandræ and Fragiles of the Genus Salix.* By the Rev. J. F. LEEFE, M.A., *Audley End, Essex.*

READ 9TH DECEMBER 1841.

KOCH, in his *Flora Germanica*, has much reduced the number of species in the genus *Salix*, and in this he is followed by Lindley, in the second edition of his *Synopsis*; nor am I prepared to say that the learned botanists just mentioned are not in many cases right in so doing. I believe, however, that in the sections known as *triandræ* and *fragiles*, they have united species which are truly distinct; at least such as have permanent and readily ascertainable characters, which I conceive to constitute sufficient claims to specific distinction. But before commencing the remarks I have to make upon the groups in question, I may perhaps be allowed to offer a few observations on the willows generally, and more particularly on the collecting of specimens.

Whoever would study the willows with success, must see them growing at different seasons of the year; for fragments gathered at one season only, serve but to perplex and confuse the botanist, and would, in my judgment, be much better at once discarded. Another source of confusion is the practice of collecting specimens, without numbering *them* and the *tree*, trusting subsequently for identification to the memory alone, whereby a most unpleasant feeling of uncertainty is produced. The changes in the form of the leaves, and in the relative proportion of some of the parts of fructification at different periods of growth, are often so surprising, that without a mark of recognition, I should frequently have doubted whether my specimens had been all collected from the same tree. Again, it is a common practice to select for preservation the largest and most vigorous-looking speci-

mens, in consequence of which an erroneous idea of the *average character* is very apt to be produced. If an unusually luxuriant specimen be chosen, it should have a corresponding label.

Were those whose residence is fixed for a great part of the year to give their attention regularly to this interesting tribe, and above all, to set aside a portion of ground in their gardens for the cultivation of the most intricate species, much of the uncertainty which at present deters botanists from the study of the *Salices* would probably disappear; but the hasty collection of fragments in flower, and above all, the un-identified addition of leaves, serves only to perpetuate mistake, and make confusion worse confounded, as I have myself learned by unpleasant experience.

If I might take the liberty of recommending to others a practice which I have myself profitably followed, I should advise that the specimens of each *Salix* in a herbarium (excepting, of course, species about which there can be no mistake), should be such as to present one or more regular series illustrative of the *progressive* development of the catkins, each set being taken from the same tree at intervals during the flowering season, and that at least two specimens of the leaves, gathered at different periods, should be preserved, so as to show the form of the stipules, and the progressive alteration in the foliage. Also, that thin sections of a catkin of each species, perpendicular to the axis, should be gummed down, by which means the form of the ovarium and any other particular respecting it—the length and pubescence of its stalk, the nectary, the character of the axis, and the number of ovaria in a given length of the spiral, could easily be seen without mutilating the other specimens. The exact date also of each specimen should be registered, whereby many ambiguities would be removed. For instance, it is common to find characters derived from the relative proportion borne by the nectary to the ovarium; but this varies greatly, as a dated series of specimens would immediately make evident,—sometimes, as in the *viminalis* group, from

$\frac{1}{2}$  to  $\frac{1}{4}$ . Good specific characters frequently disappear in the drying process,—for instance the furrowed shoots of *S. amygdalina*, which afford an excellent mark of distinction from *S. Hoffmanniana* in fresh specimens, cannot be relied upon when the specimens are dry, owing to the shrivelling of the bark.

The willows, though numerous here (Audley End, Essex), are not cultivated to such a profit as they might be. *Salix Russelliana*, though plentiful, is confounded with *S. fragilis*, nor is the bark held in any esteem. The cærulean variety of *S. alba* has, however, been sold to advantage to the makers of bonnet shapes, as it is reputed not to stain. To show the quick return which the arborescent willows would afford, I may mention, that a tree of *S. alba* var. *cærulea* planted in 1815, at the end of nineteen years measured in circumference, at one foot from the ground, 7 feet 8 inches. Its girth taken in October 1841, at twenty-six years of age, gave 10 feet  $\frac{3}{4}$  of an inch, and its height was 77 feet.

## I. TRIANDRÆ.

1. *Salix lanceolata*, Sm. *English Botany*, t. 1436 (very characteristic).  
*S. undulata*, Ehrh. var.  $\beta$ . Koch. *Fl. Germ.* p. 645.

This willow differs considerably from the rest of the *Triandræ*. The shoots are green, and not even angular at the extremities; the leaves are rather narrow, and truly lanceolate, with a long taper point; they are finely and sharply serrated, the margin being somewhat reflexed; dark green and shining above, paler beneath, and sometimes glaucous;  $5\frac{1}{2}$  inches long, and  $\frac{3}{4}$  inch broad; quite flat; not *undulated*; sometimes bearing a pair of small leaflets at the summit of the petiole; stipules lanceolate, with an auricle at the base. The catkins spring from small tufts of leaves which are smooth, except in their very young state, veiny, serrated, and of a light shining green; they vary from one to two inches in length, and are yellowish, lax at the base, but denser above. Axis and scales thickly clothed with weak

yellowish pubescence ; scales vaulted lanceolate, not generally equal with the ovarium, but variable. Ovarium perfectly smooth, as well as its stalk ; very much constricted about the middle ; style short, stigmas spreading, thickest at the point, and emarginate or even cloven half-way down ; nectary larger than in the rest of the group, and approaching to a cylindrical form, about half the length of the stalk of the ovarium.

This species, if really triandrous, serves to connect the *triandrae* with the *monandrae*, with which it accords in several particulars. The *S. undulata*, Ehrh., of which there is a specimen in Reichenbach's *Flora Exsiccata*, agrees with our Essex plant, except that the scales in the German specimens are less woolly. There is hardly the slightest appearance of pubescence on the ovarium of Reichenbach's plant, even under a good lens. The female alone occurs here, and I have never observed the leaves to be undulated, which justifies the trivial name of Smith ; nor can I find the *but-tress-like projection*, remarked by the author of the English Flora.

2. *S. triandra*, L., Sm. *Eng. Fl.* 4. p. 166, var. *contorta*? Crowe. *S. triandra*, Curtis, *Fl. Londinensis*. I do not feel certain that Curtis' description applies to my plant.

Young branches yellowish brown, shining, somewhat angular towards the points ; leaves undulated, lanceolate or linear lanceolate, sometimes unsymmetrical with respect to the midrib ; serrated, the serratures being irregular and glandular. Stipules reniform, bluntly serrated, smaller than in *S. Hoffmanniana* or *amygdalina*. Male catkins (which are all that occur here), on a woolly stalk about half an inch long, with a few narrow floral leaves at the base ; more abundantly produced than in *S. Hoffmanniana* ; axis of the catkins woolly ; scales yellow, rounded, hairy ; filaments thrice the length of the scale. Young shoots dying back at the points, which is also the case in the two next species, and owing to which it is not always easy to procure good specimens.

I have referred this plant with hesitation to *S. triandra* var. *contorta*, Crowe, because it does not appear exactly to agree with *S. triandra*, as described by Smith. The shoots are somewhat angular, and its leaves remarkably undulated and pale, but not glaucous beneath. The leaves on my specimens are also smaller than those of *S. triandra* in English botany, and the catkins differ slightly.

3. *S. Hoffmanniana*, Sm. *English Botany*. t. 2620 (very good). Koch. *Fl. German.*, p. 644, included in the description of *S. amygdalina*.

Bark with livid blotches, not of a lively shining colour as in the last. The male only occurs here. Leaves flat; broader from the very first, than in the last species; and this applies also to the floral leaves; nowhere linear; dark green above; paler, but not glaucous beneath; midrib and numerous veins brownish; on vigorous shoots they are ovate or ovate-lanceolate, and rounded at the base;  $3\frac{1}{2}$  inches long, by  $1\frac{1}{2}$  broad. The largest leaf on my specimens is  $4\frac{1}{4}$  inches in length, exclusive of the petiole. In the form of its leaves, *S. Hoffmanniana* comes nearer to *S. amygdalina*, though they are more acuminate than in that species. The catkins closely resemble those last described, but they are more sparingly produced, and the axis is more woolly, and the much broader floral leaves more decidedly hairy. I believe this to be a very distinct species.

4. *S. amygdalina*, L. *S. amygdalina*, *β. discolor*. Koch. *Fl. German.*, p. 644; *English Bot.* tab. 1936. (Female part very good. The female catkin is, however, in an advanced state, and the proportion between the ovary and scale very different from what occurs in an earlier stage.)

This, and the two preceding species, were first pointed out to me as the Quince willow, from their shedding their bark annually. The female only occurs here. Young branches pale yellow, strongly furrowed, having even a twisted and distorted appearance. The furrows are occasioned by three prominent ridges (similar to what is seen in the black Italian

poplar) at the base of each bud, which extend to some distance down the shoot, and gradually disappear. The full-grown leaves are ovate, or ovato-oblong; rather crenated than serrated; very pale above, and glaucous beneath; midrib stout and reddish; stipules smaller than in the last; floral leaves about an inch long, pale beneath, smooth and shining above, more or less serrated towards the middle, very veiny, downy towards the points, and elliptical; catkins at first almost buried within the bosom of the leaves, dense, numerous, greenish yellow, from half an inch to an inch long, regular; axis thick; ovary on a stalk about half its own length, flattened and quite smooth, longer than the pale yellow rounded scale, which is thin in substance, wrinkled, and bears a few weak hairs on the margin; style none; stigmas spreading horizontally, thickest at the points, and emarginate. The ovary has two deep depressions running along its whole length, on the sides opposite to the scale, and two shallower and less continuous on the other sides; nectary, a small roundish yellow gland.

## II. FRAGILES.

5. *S. decipiens*, Hoff. *Eng. Fl.* 4. p. 183. *S. fragilis*,  $\alpha$ . Koch. *Fl. Germ.* p. 643; *English Botany*, tab. 1937 (characteristic).

I am only acquainted with the male of this species. Young wood very much polished, like porcelain or cane, and of a yellowish white colour. Buds black, contrasting remarkably with the bark. The young shoots in the summer are often of a fine red hue, which frequently extends to some distance up the midrib of the leaves. Catkins, accompanied by the young leaves, an inch or an inch and a half in length, tapering towards the point, and very dense; stamens two, filaments much longer than the scales, which are small, pale, and fringed, with long, weak, and whitish hairs; nectary minute rounded. The floral leaves are broadest in the upper half, and reflexed at the points, so that they present a somewhat vaulted appearance; they are very veiny,



and obscurely serrated with a prominent midrib. This species is readily distinguished even in winter from either *S. Russelliana* or *S. fragilis*, by its polished shoots and black buds. In its leaves it also differs from both the above-named willows. They are shorter and broader in proportion than those of *S. Russelliana*, and less coarsely serrated; nor are their points so long and tapering. The floral leaves of *S. decipiens* are quite different, and are very well represented in Eng. Bot. From *S. fragilis*, which in the leaves it more closely resembles, it may be known by their being of a bright shining green, instead of the lurid hue of the latter. Those also of *S. fragilis* are less coarsely serrated, and generally glaucous or bluish beneath; whereas those of *S. decipiens* are paler on the under side, but not glaucous, and beautifully reticulated,—a character perceptible in well-dried specimens. The male catkins are tapering, dense, but not thick, and quite unlike those of *S. fragilis*, which are two or even three inches in length, and extremely handsome. This species appears to be of little use, but it forms a handsome bush or small tree, remarkable at a short distance for the bright hue of its leaves.

6. *S. fragilis*, L., *Eng. Fl.* 4. p. 184. *S. fragilis*,  $\beta$ . Koch. *Fl. German.* p. 643; *Eng. Bot.* tab. 1340 (characteristic).

As this species has been contrasted with *S. decipiens*, and will be distinguished from the following species, many remarks are unnecessary. I may observe, however, that the rounded base of the leaves does not seem to me to be a character to be depended upon, and I have also failed to remark the peculiar insertion of the branches insisted upon, as an easily recognisable feature, by Sir J. E. Smith, in *English Flora*. The female is rare here, nor is it, I believe, generally common; it also seems to differ slightly in the form and colour of its leaves from the male. It is right, however, to mention, that all the female specimens I have seen were taken from very old trees. I do not mean to assert that the characters by which I have been enabled to distinguish the

willows of this neighbourhood, are absolutely without exception. They are what may be called *average* characters. I have often seen specimens which would have perplexed me, had I met with them in a herbarium, but the variation of which I was able to rectify, by comparison with the other branches; and it was this which induced me in the first part of the paper, to urge the propriety of selecting such specimens as correctly represent the average character of the species, or if not, of preserving a regular series to illustrate its aberration.

7. *S. Russelliana*, Sm. *Eng. Fl.* 4. p. 186. *S. fragilis*,  $\gamma$ . *Russelliana*, Koch, *Fl. Germ.* p. 643; *English Botany*, tab. 1808 (good, but the catkins are in a young state, and the plate does not express their appearance when fully developed).

Readily distinguished from *S. fragilis* at the distance of several yards by its lighter colour. The leaves are longer and narrower in proportion, especially the floral leaves, and much more coarsely and unequally serrated. I have never seen the male. A specimen communicated to me under that name, from the neighbourhood of Edinburgh (does it really grow there?) was *Salix alba*; the female, however, is not uncommon here, and I have also collected it in Yorkshire. The catkins of *S. Russelliana* vary from two to three, and even four inches in length, and are very lax. The scales are similar in colour and general appearance to those of *S. fragilis*, but narrower and more pointed, and copiously clothed with weak hairs; whereas those of *S. fragilis* are often almost smooth. In *S. fragilis*, the scales nearly equal the stigmas, but in *S. Russelliana* the ovary overtops the scale by a third, or sometimes half its length. The ovary is smooth, long, and narrow, and tapering gradually from the base. About the middle it is somewhat constricted parallel to the scale,—style hardly distinguishable from the ovary, except by its transparency. Nectary a flattened cylinder, short and yellow, not equalling the stalk of the ovary. In *S. fragilis* the nectary is smaller, the ovary shorter and broader, and of a more clumsy shape; the style also is

shorter, and the ovarium more constricted, but similarly. The characters of *S. fragilis* and *S. Russelliana*, derived from the serrature of the leaves, the form of the ovarium, and the proportion it bears to the scale, I have by repeated examination found to be constant. The scales, it is true, soon fall, but even then the shape of the ovarium in the two affords a clear distinction. *S. fragilis* and *Russelliana* both form large trees, but do not appear to grow so fast, or to attain so large a size as *Salix alba*.

8. *Salix alba*, var. *cærulea*, Sm. *Eng. Bot.* 4. p. 231. *S. alba*, β. 644, Koch. *Fl. Germ.*; *Eng. Bot.* tab. 2431 (good).

I have long thought *S. alba* closely allied to the *Fragiles*, and now venture, with Koch for my authority, to include it among them. The young leaves of *S. Russelliana* are distinctly downy, and in the female catkins the resemblance is close. In some degree, indeed, *S. alba* var. *cærulea*, may be considered intermediate between *S. Russelliana* and *S. fragilis*. The ovarium is near in form to *S. fragilis*, but the scale affords a well-marked distinction; it is broad, and somewhat clasping at the base, and suddenly contracted in a peculiar manner. The male may be known by its floral leaves, which are remarkable for a beautiful border of close-set white pubescence. The leaves in this variety soon lose their pubescence, and become dark-green above, glaucous or bluish beneath, and smooth, with the exception of the midrib. This certainly seems to be a valuable variety, as its growth is remarkably rapid.