Hypericum × *desetangsii* Lamotte nm. *desetangsii* in Yorkshire, with special reference to its spread along railways

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ABSTRACT

Records for *Hypericum* × *desetangsii* nm. *desetangsii* for Yorkshire are given, with an account of the distribution of the parental species, *H. perforatum* L. and *H. maculatum* Crantz, in the county. In Yorkshire, the hybrid has almost always been found in the absence of both parental species and only occasionally with *H. perforatum* L. The hybrid is very variable, particularly in the case of populations on railways sites. A hybrid index has been used to assess the degree of hybridity in individual plants. The distribution of the hybrid and its backcrosses is discussed. The introduction of the hybrid onto railway sites may have been followed by backcrossing with *H. perforatum* and in the course of time some taxa may have been lost.

INTRODUCTION

Prior to 1987, *Hypericum* × *desetangsii* Lamotte nm. *desetangsii* (*H. maculatum* Crantz subsp. *obtusiusculum* (Tourlet) Hayek × *H. perforatum* L.) was believed to be rare in Yorkshire, v.cc. 61–65, having only been recorded ten times (Crackles 1986).

Whilst staying in Ilkley, GR 44/11.47, in mid-May, 1987, I tentatively identified the hybrid by vegetative features at a quarry near Burton Leonard, GR 44/32.63, and on three sites adjacent to railway stations on the Leeds to Ilkley railway line. Identification of plants from these sites was confirmed in the flowering season, except for those at Burley-in-Wharfedale which were cut before they had a chance to flower. Interest having been aroused, additional localities for *H.* × *desetangsii* have been found in the Ripon area, GR 44/3.6 & 44/2.7, and along railways in v.cc. 61, 62 and 64 during 1987 and 1988. Details of these records are given below and in the forthcoming Flora of v.c. 61.

RECORDS

N.E. YORKS., V.C. 62

Railway records: One plant in the disused Pilmoor Junction station and a continuous belt, stretching some 30 m, along the immediately adjacent main York to Edinburgh line GR 44/4.7, 1988, *F. E. Crackles (F.E.C.)* & *J. E. Duncan (J.E.D.)*. See also the Yorkshire Naturalists' Union's annual report (1973).

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Non-railway records: Low Grass Wood, Grassington GR 34/9.6, 1988, *H. Lefevre (H.L.)*; open woodland, north-west of Ripon GR 44/2.7, 1987, *D. E. Haythornthwaite (D.E.H.)*; quarry, Burton Leonard GR 44/3.6, 1987, *F.E.C.*; Quarry Moor, near Ripon GR 44/3.7, 1972, *D.E.H.*, det. N.K.B. Robson, see also *The Naturalist*, p. 112 (1976). Railway records: disused line, near Threshfield GR 34/9.6, 1987, *H.L.*; Embsay station GR 44/0.5, 1987, *J.E.D.*, det. N.K.B.R.; areas adjacent to Ilkley and Ben Rhydding stations GR 44/1.4, 1987, *F.E.C.* & *J.E.D.*; Guiseley station GR 44/1.4, 1987, *J.E.D.*; along the disused Harrogate to Ripon line near Bishop Monkton GR 44/3.6, 1987, *D.E.H.* and at Littlethorpe GR 44/3.6, 1988, *F.E.C.* & *J.E.D.*; in quantity by the main line between York station and Dringhouses sidings GR 44/5.4, 1981, *T.F.Medd*.

N.W. YORKS., V.C. 65

There are no railway records. By R. Swale, above Richmond GR 45/1.0, 1968, *J. A. Gilleghan*. Additional records are given in Sledge (1961) and *The Naturalist* **104**: 70 (1979).

DISTRIBUTION OF PARENTAL SPECIES

Hypericum maculatum Crantz subsp. *obtusiusculum* (Tourlet) Hayek appears to have been always very uncommon in Yorkshire. Perring & Walters (1962) gave the species as having occurred in eight 10-km squares. Watson (1883) gave v.c. 61 in the list of vice-counties in which the species had occurred, but no details have ever come to light and there have been no later records. Baker (1863) stated that the species was "much less frequent" in N. Yorkshire than *H. perforatum* and cited seven localities, mainly in hilly country. Lees (1888) described the species as occurring in bushy places, mainly by water courses, "rare, although plentiful enough in certain areas". He included a record for a stone quarry at Hutton, to the north-east of Ripon, GR 44/3.7, one of the 10-km squares in which the hybrid has been found in recent years. Since 1945, there have been nine Yorkshire records for *H. maculatum*, in Annual Botanical Reports in *The Naturalist*, one for v.c. 62, five for v.c. 63, two for v.c. 64 and one for v.c. 65, but none for a 10-km square for which the hybrid has been recorded, with the possible exception of the record for Langton-on-Swale, GR 44/2.9, v.c. 65 (Sledge 1961). Two additional 10-km square records for v.c. 65 are given in Perring & Sell (1968), the specimens in both cases having been examined by N. K. B. Robson.

Hypericum perforatum L. is widely, but unevenly distributed in Yorkshire (Perring & Walters 1962), being common in many areas.

OCCURRENCE OF THE HYBRID IN RELATION TO THAT OF THE PARENTAL SPECIES

In most Yorkshire localities, the hybrid has not been found in the presence of both parents. *H. perforatum* was also present in five localities: Embsay station GR 44/0.5; woodlands north-west of Ripon GR 44/2.7; disused line, Bishop Monkton GR 44/3.6; Guiseley station GR 44/1.4 and Water Fulford GR 44/6.4 and was often introgressed. Only at Langton-on-Swale, GR 44/2.9, were both parents recorded as present in the same area, but the presence of *H. maculatum* was later questioned (Sledge 1961). The hybrid and *H. maculatum* are recorded for the same 10-km square only in the Ripon and Richmond areas (10-km squares 44/3.7 and 45/1.0).

VARIABILITY OF THE HYBRID

I have examined at least one specimen of the hybrid from each Yorkshire site where it has been found since 1986. The specimens, particularly from railway sites, are so variable that a hybrid index was developed to assess the degree of hybridity in each case. The method of scoring, using only those characters generally accepted as those of the F_1 hybrid (Robson 1981), is given in Table 1. A summary of the results of hybrid index analysis of specimens examined is given in Figs 1 & 2.

Most plants of a population of *H.* × *desentangsii* on a roadside verge near Arnold in Holderness, v.c. 61, conform fully to the description of the F_1 hybrid as do populations on three railway sites. Populations on three sites in the Ripon area including that on the disused line near Bishop Monkton and cultivated plants grown in a garden near Knaresborough and which originated from Quarry Moor, near Ripon, are generally similar to each other and have a high score in the hybrid index analysis (score 6–8). However, the sepals instead of being blunt and apiculate are usually acute and attenuate, but nevertheless broad and erose-denticulate. In some such specimens, the occasional sepal may be blunt and apiculate. It should be noted in this connection that plants of the hybrid found near Langton-on-Swale in 1960 had lanceolate sepals which were pointed (Sledge 1961).

First generation hybrids were found immediately adjacent to the platform at Guiseley station and on the same railway line near to Ilkley station. Near Guiseley station there was also a population of *H. perforatum* and another showing some signs of hybridity (score 4). Specimens from the Ilkley station car park (formerly the station yard) and the population immediately behind the platform at

TABLE 1. METHOD OF SCORING THE HYBRID INDEX

Character	*Hypericum maculatum* Score 2 (or 1)	Intermediate Score 1	*Hypericum perforatum* Score 0
Leaves	No pellucid dots or a few on upper leaves only	Lowest leaves with no pellucid dots	All leaves with pellucid dots
	Densely reticulate venation	Distinct, laxly reticulate venation	Inconspicuous minor veins
Stems	Stem square for its full length	Signs of 2nd pair of lines or incomplete square-stemming	Two raised lines only
Sepals			
Width	Wide	Intermediate	Narrow
Apex	Obtuse and rounded	Some sepals obtuse and apiculate	Acute
Margin near apex	Erose-denticulate	Slightly erose-denticulate	Entire
Petals	Black lines (score 1)		

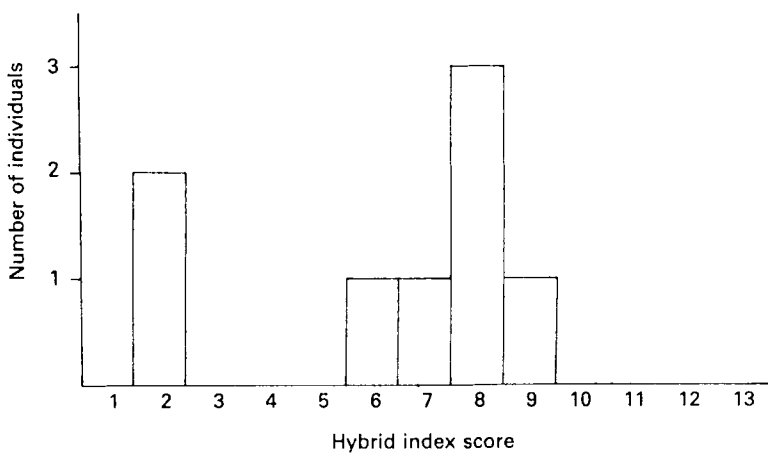

FIGURE 1. Histogram of the hybrid index scores for populations sampled on non-railway sites.

Bed Rhyddiang station, 1·5 km west of Ilkley, were backcrosses (score 5–6). Most sepals are acute, occasional ones obtuse and erose, with sparse denticulation. N. K. B. Robson examined two specimens from Embsay station, on the former Skipton to Threshfield line, a branch of the Leeds to Ilkley line. Both specimens had numerous pellucid dots on their leaves. One specimen had "rather broad sepals with the apex apiculate and erose-denticulate" whilst the second specimen had "acute entire sepals". Both had "black glandular lines on the petals found in *H. maculatum* and more reticulate veins than is usual in *H. perforatum*". These specimens had a hybrid index score of 6 and 3 respectively. Near Threshfield, on a disused section of the same line, Miss H. Lefevre found plants with few pellucid dots on the leaves and sepals which were narrow and acute, but erose and denticulate (score 6).

Plants believed to be introgressed *H. perforatum*, with one or two hybrid features only, have been found with good intermediates at Bishop Monkton and at Embsay and Guiseley stations; they also occur in the absence of the hybrid in a gravel pit and on a waste place near Ilkley and on a disused

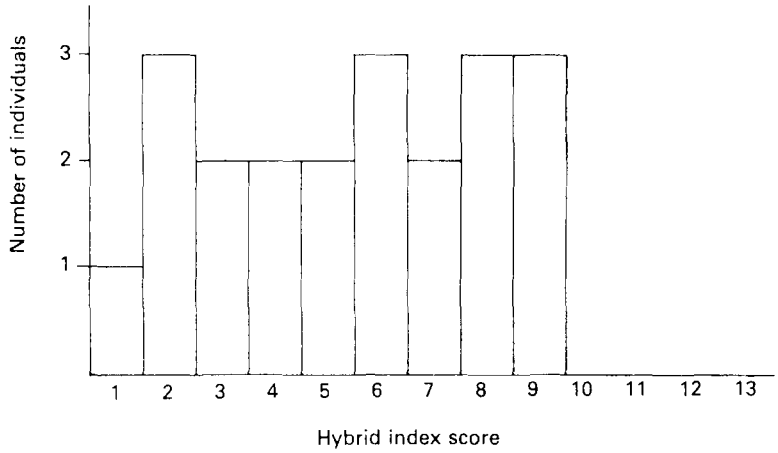

FIGURE 2. Histogram of the hybrid index scores for populations sampled on railway sites.

railway line at Deighton, GR 44/6.4, v.c. 61. Introgressants in the Ilkley area are the only ones found on non-railway sites.

DISCUSSION

The widespread occurrence of *Hypericum* × *desetangsii* in Yorkshire almost invariably in the absence of one or both parents is of considerable interest. The occurrence of the hybrid in such circumstances is possible owing partly to a capacity for limited vegetative propagation and partly to its fertility (Robson 1975). The presence of the hybrid may indicate that both parental species once occurred in the area. Near Arnold in Holderness, GR 54/1.3, the hybrid occurs on a remarkable species-rich roadside where both calcicoles, calcifuges and species of both well-drained and wet soils are to be found, including *Achillea ptarmica*, *Anemone nemorosa*, *Avenula pubescens*, *Carex spicata*, *Filipendula ulmaria*, *F. vulgaris*, *Lathyrus montanus*, *Lotus uliginosus*, *Ononis spinosa*, *Serratula tinctoria*, *Silaum silaus*, *Succisa pratensis* and *Trifolium medium*. With the exception of the plants at Littlethorpe, the populations in the Ripon area (i.e. in 10-km grid squares 44/2.7, 44/3.6 and 44/3.7) are similar, suggesting a common origin. Plants on the stretch of the disused Harrogate to Ripon line near to Bishop Monkton appear to relate to the non-railway hybrid populations in the area. This stretch of disused line is being managed as a nature reserve, its vegetation being regarded as relict grassland of a type present in the district before the railway was constructed. Species present include: *Avenula pubescens*, *Blackstonia perfoliata*, *Bromus erectus*, *Dactylorhiza fuchsii*, *Knautia arvensis*, *Origanum vulgare*, *Pimpinella major*, *P. saxifraga*, *Rhinanthus minor*, *Silaum silaus* and *Trifolium medium*. *H. maculatum* is known to have occurred at some time near to both Ripon and Richmond, in 10-km grid squares 44/3.7 and 45/1.0 respectively.

The hybrid tends to occupy habitats intermediate in wetness between those of the parents, which do, however, have overlapping habitat requirements. It is possible that there has been some loss of suitable habitats for *H. maculatum* in the course of time, whilst environmental changes may have favoured the survival of the hybrid. The presence of the hybrid on so many railway sites in districts where *H. maculatum* has never been found leads one to the conclusion that the hybrid has been introduced along the railways by air movement generated by trains or by other railway activity.

Backcrossing from the hybrid occurs readily in both directions, thus producing a more or less continuous range of variants between the parental species (Robson 1981). Variants of the hybrid, other than F_1s, found along railways in Yorkshire are consistent with these being backcrosses to *H. perforatum*. Introduced first generation hybrids may have come into contact with *H. perforatum* growing along the line and backcrossed with it, as seems to have happened at Guiseley station.

Further away from the point of introduction, one might expect backcrossing to be more pronounced, as it is at both Embsay and Threshfield. Hybrids on disused lines must have been there since the days of the steam-train, indicating that the present situation has arisen over a long period of time during which taxa may have been lost. It is also possible that the initial introduction may have been a backcross or an introgressant.

The fact that the *Hypericum* × *desetangsii* has been found in quantity along the York–Newcastle–Edinburgh line and by the main York–Doncaster–London line suggests that its spread along railways is unlikely to have been confined to Yorkshire.

There are records for the hybrid for railways in other parts of Great Britain. It is significant that in 'Plant Records' in *Watsonia*, there are first vice-county records for disused railway lines in Montgomery, v.c. 47, and Merioneth, v.c. 48, both in 1971 and in Roxburghshire, v.c. 80, in 1975 and a second vice-county record at Crediton station in Kircudbrightshire, v.c. 73, in 1977.

The hybrid is known to have occurred in close proximity to both parental species on the disused Waverley line (M.E. Braithwaite pers. comm.) at Acreknowe, GR 36/5.0, and at Longnewton, GR 36/5.2 (Braithwaite 1975). The Waverley line formerly connected Hawick with Edinburgh and was also linked to Carlisle and Newcastle.

There is no doubt that *H.* × *desetangsii* has been overlooked in Yorkshire even on a nature reserve. Detection of backcrosses requires care. The examination of a single leaf is not enough. In some hybrid plants, median leaves may have many perforations and exceptionally all leaves may have pellucid dots, so that sepals should also be examined. It should also be remembered that all the plants of a population may not have the same combination of characters.

May I suggest that botanists should examine all railway populations of St. John's Worts critically and publish their observations and so help to throw further light on this intriguing story.

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