STUDIES IN THE BRITISH *EPIPACTIS*
VI. SOME FURTHER NOTES ON *E. PHYLLANTHES*

By DONALD P. YOUNG

ABSTRACT

Self-fertilisation of *E. phyllanthes* occurs by germination of pollen in the clinandrium. The somatic chromosome number is 36. Plants answering to var. *pendula* have now been found in several places in the south of England, and there is no material dividing-line between this form and var. *vectensis*. A list of new records is given. The species also occurs in Ireland, and in France and Denmark, and its distribution appears to be Atlantic in pattern. One natural habitat for it is in wet willow-holts on the alluvium of chalk streams.

The following notes are supplementary to Part IV of this series (Young 1952).

FERTILISATION

In Part IV the speculation was advanced that *E. phyllanthes* might be apomictic, as the process of fertilisation was not visible. Emasculation experiments showed that, if the pollinia were removed before their membrane had ruptured, no seed was set. If, however, the pollinia had become friable (which occurred long before the perianth had opened), it was not possible to remove them completely, and eventually a limited number of seeds matured in the capsule. Later, Dr. O. Hagerup kindly made sections of the column of an unexpanded flower, and demonstrated that the pollen was germinating in the clinandrium, on the upper edge of the stigma. From there pollen-tubes were passing down the stylar canal into the ovary, and embryos were already formed. Although union of gametes was not actually observed, he had no doubts that self-fertilisation was occurring in this case (Fig. 1).

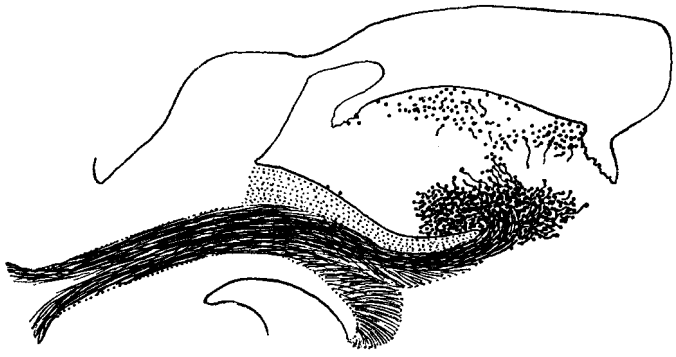

Fig. 1. Longitudinal section of column from unopened flower of *Epipactis phyllanthes* (v.c. 24 : Dorney), showing germination of pollen; x 35. (Preparation and drawing by O. Hagerup).

Dr. Hagerup also made a chromosome count on Danish *E. phyllanthes*, and found $2n = 36$*. Most other European species normally have $2n = 40$.

*This was first reported by Hagerup (1947) under the name *E. leptochila*, which has been quoted by other authors. To the best of my knowledge, the chromosomes of *E. leptochila sensu stricto* have not yet been counted.

VARIATION

Plants which would come under var. *pendula*, i.e. with hypochile equalling the epichile, have now been found at E. Tisted (v.c. 12), Thakeham (v.c. 13), Wilstone (v.c. 20), and Harpsden (v.c. 23). These are within the area in which var. *vectensis* (hypochile shorter than epichile) and varieties with a degenerate lip are general. Other plants, e.g. from Thriplow (v.c. 29), possess a broad cordate epichile like var. *pendula*, but a smaller hypochile. There is thus no material dividing-line, either geographical or morphological, between var. *pendula* and var. *vectensis*. The names are retained here for convenience of description.

Lip variation in colonies recently discovered has been on the same lines as previously described. As observed in Part IV, a few colonies contain more than one lip-form, but in the majority the lip-shape is constant throughout the population. On the other hand, variation between colonies is very great. The distribution of forms with a degenerate lip-shape is centred on the southern counties, but within this area the different forms seem to be distributed quite at random. In parts of Hampshire and Wiltshire, particularly, colonies are thickly scattered within a few miles of one another, yet scarcely two are identical in flower-form. Their evident isolation suggests that very little long-distance dispersal by seed takes place. Probably most of these small populations have been reduced to a single biotype. They may be the relics of a very variable population extending over the southern counties when they were mainly forest-covered.

Unfortunately, the lip-shape in colonies outside Britain has not been studied very fully, on account of scanty and poor material. However, in all specimens where it could be discerned, the lip was perfectly differentiated.

DISTRIBUTION

E. phyllanthes has been found on the Continent and also in Ireland. Its distribution appears to be Atlantic in character, running from the Pyrenees up the west coast of France, through England and Ireland, and reappearing in Denmark (Fig. 2). It should be looked

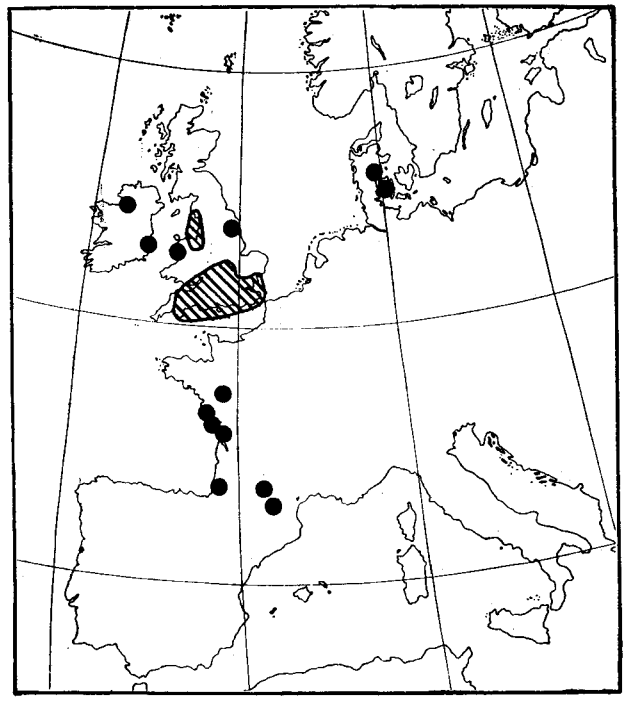

Fig. 2. Known distribution of *Epipactis phyllanthes*.

for in northern France, where it is unrecorded but likely to occur.

In Parts II and IV, reference was made to an allied Scandinavian plant tentatively included under *E. persica* (Soó) Hausskn. ex Nannf. Further investigations by the writer (Young 1953) showed that this was best regarded as a separate species, *E. confusa* D. P. Young. This is a more slender plant, with narrower leaves, smaller and less pendent ovaries, smaller seeds, thinner and less copious roots, and 40 somatic chromosomes. It is related to *E. persica* (*sensu stricto*), which is an Asiatic species extending from Turkey to Afghanistan. The ranges of *E. phyllanthes* and *E. confusa* just overlap in Denmark.

European Records for E. phyllanthes

FRANCE

Maine-et-Loire : recorded by Jovet (1957); I have not seen the specimen.

Vendée : pine forest on sand-dunes, Forêt d'Olonne, 1880, *C. Pontarlier* (**LD, UPS**), 1953! (herb. Young) (lip small, perfect; var. *pendula*).

Charente-Mme.: pine forest, Forêt de Foulerot near St. Georges d'Oléron, 1891, *N. Reau* (**P**); Forêt d'Arvert, 1889, *A. Guillon* (**P**).

Basses-Pyr.: Bayonne, 1836, *Grenier* (**P**); pine plantations on banks of R. Adour, Boucau and Anglet, 1883, *Blanchet* (**MANCH, P**) (lip perfect, rather narrow).

Hte.-Garonne : wood at mouth of the Ariège, Toulouse, 1850, *Timbal-Lagrave* (**P**).

Pyr. Or.: Olette, 1853, *Loret* (**P**).

DENMARK

Jutland, Falster (var. *pendula*; Young 1953).

New British Records

The following are supplementary to the list given in Part IV. Some have already been published in " Plant Records," but references are only given to where substantial further information can be found. Records are recent unless a date is quoted.

The lip-form is indicated as follows : (*a*) var. *phyllanthes*, (*b*) var. *degenera*, (*c*) var. *vectensis*, (*d*) var. *pendula*. I have seen the colonies marked ! *in situ*.

V.C. 5. S. SOM.: roadside near Taunton, 1891, *C. Bailey* (**MANCH**).

8. S. WILTS.: beech plantations, Boyton (*c*; epichile broad, reflexed), *B. M. Stratton* (**K**, herb. Young); edge of beech-wood, Erlestoke (*c*), *W.O. Cobbett*!; under beeches, Harnham (*b*), *D.E. Coombe*!; beech-belts, Berwick St. James (*c*), Steeple Langford (*a*), and Durnford (*c*), *A. Roseweir*; beech-belt, Winterbourne (*c*, epichile only just longer than hypochile), *J. Hemsley & A. Roseweir*; plantation, Stapleford, 1876, *E. S. Marshall* (**K**); beech-yew belt, Stapleford (*c*), A. *Roseweir*; beech-belt, Coombe Bissett, *Miss H. Lamb* (**K**).

11. S. HANTS.: willow-holts, Nursling (*c*) (several hundred plants over a wide area; **K**, herb. Young), near Swaythling (*b*) (**K**), and Bossington (*b*) (**K**), and plantation on river mud, Eling (*c*) (Herb. Young), *P. Bowman*!; plantation on alluvium of Itchen, Twyford (*b*, differentiation almost perfect), *A. Roseweir*!; canal bank amongst *Petasites*, Otterbourne (*b*), *Mrs. J. Goater*!; beech-wood, Bishop's Waltham (*b*) (**K**), and beech-belts, Little Somborne (*b*), W. Tytherley (*b*), and Broughton (*b*) (**K**), *A. Roseweir*.

12. N. HANTS.: beech-yew belt, Crawley (*c*) (**K**), *A. Roseweir*!; some miles from the previously-known Crawley locality, where *P. Bowman* found var. *vectensis* occurs as well as var. *degenera*!; beech-woods, E. Tisted (*d*) and Cranbourne, beech-clump, Hurstbourne Priors, and beech-belt, Overton (*b*), *A. Roseweir*; in adjoining beech-belts, Nether Wallop and Abbott's Ann (*a*) (**K**), *Miss D. Stevens*!; hedgebank, Conford (*a*), *Mrs. E. Briggs & Mrs. Missen*!.

13. W. SUSSEX : copse beside lake, Arundel (*b*), *Miss B. M. C. Morgan & Miss D. Powell* (herb. Young); under oaks on sandy soil, W. Chiltington (*a*), *Miss D. A. P. Long & Mrs. Thatcher*; shady roadside, on chalky grit (over sand), Thakeham (*d*), *J. T. H. Knight*.

16. W. KENT : plantation belt, Eynsford (*b*), *Mrs. Denton*! (**K, S, UPS**, herb. Young).

17. SURREY : Mr. Spicer's park near the railroad, Esher, n.d., *H. C. Watson* (**K**); this would be on the bank of the R. Mole.

20. HERTS.: amongst grass in orchard, Chorley Wood, *R. F. Turney*! (**K**); edge of wood on bank of stream, Wilstone (*d*), *R. I. Sworder* (herb. Young).

23. OXON.: plantation beside tributary of Thames, Crowmarsh (*c*), 1925, *R. R. Hutchinson* (CYN), 1956! (K); beech-wood, Harpsden (*d*), *G. J. Munday*! (**BR**, **K**, herb. Young); beech-wood, Bix, *D. J. Tennant*; beech-wood, Rotherfield Greys (*b*), *V. S. Summerhayes* (**K**).
24. BUCKS.: beech-wood, Chalfont St. Giles, *R. F. Turney*! (**K**); beech-wood, Great Marlow, *F. Rose*.
29. CAMBS.: mixed wood on bank of stream, Thriplow (*c*; epichile broad, cordate), *Mrs. G. Crompton* (**CGE**, herb. Young).
48. MERION.: sand-dunes, amongst *Salix repens*, Morfa Dyffryn (*d*) (Benoit 1959; **K**, herb. Young).
51. FLINT.: now known to be in a number of places around Rhyd-y-Mwyn and Pant-y-Mwyn in Mold R.D., under willows, beech, and ash (*d*).
55. LEICS.: 'Leicestershire,' n.d., *R. M. Norman* in herb. Syme (**BM**).
60. W. LANCS.: sandhills between St. Anne's-on-Sea and Fairhaven (*d*), 1890 and 1902, and waste ground, St. Anne's, 1901, *C. Bailey* (**MANCH**).
61. S. E. YORK : S. Cave (*c*) (Young 1955; **K**).

H20. WICKLOW : dunes, Brittas Bay (?*c*) (Webb 1953, Sipkes 1954; **TCD**, herb. Young).
H33. FERMANAGH : damp mossy woods on limestone, Lurgan River glen, 1948, *R. D. Meikle & J. McK. Moon* (**K**).
H40. DERRY : beech-wood on sandy soil, Castledawson (*d*), *D. McClintock & J. McK. Moon* (herb. Young).

ECOLOGY

It has become clear that one natural habitat for *E. phyllanthes* is in willow-holts on the calcareous alluvium of chalk streams. There are numerous such habitats along the rivers Test and Itchen, even on the tidal reaches. The plant also grows in equivalent habitats such as plantations on stream and river banks. It seems to have been overlooked in such places until recently; their herbaceous flora is usually coarse and botanically uninviting, but *E. helleborine* sometimes accompanies *E. phyllanthes* in them. These orchids are quite amenable to periodical inundation, but they avoid hollows where the ground is permanently waterlogged, keeping to ridges and banks where the drainage is better.

Most of the recently reported woodland stations have again been in small copses, tree-belts and the like. When the plant has been found in extensive woods it has usually been near the margins. This behaviour has already been remarked in Part IV. *E. phyllanthes* clearly prefers comparatively light shading, in contrast to *E. leptochila* and *E. purpurata* which seek heavy shade in the interior of woods. *E. helleborine* is intermediate in this respect, and the Continental *E. muelleri* (see Part V) requires only very light shade.

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