ONDINEA, A NEW GENUS OF NYMPHAEACEAE

C. DEN HARTOG

Among water-plant material received on loan from the Western Australian Herbarium, South Perth, there was a very remarkable *Nymphaeacea* which did not fit in any of the 8 genera so far described in this family. Mr. R. C. Royce, the curator of the herbarium mentioned above, kindly gave his permission for me to work out this material. Fortunately, additional specimens of this taxon were received on loan from C.S.I.R.O., Canberra, through the kind collaboration of Miss Dr. N. T. Burbidge. Dr. R. C. Bakhuizen van den Brink, Leiden, rendered the diagnosis into Latin. Miss R. van Crevel prepared the drawing. Mr. J. Muller studied the pollen of the plant; his findings are given in an appendix to this paper.

ONDINEA den Hartog, *genus novum*

Plantae aquaticae monoeciae perennes. *Folia* radicalia, alterna, in parte apicali tuberi inserta, petiolata, subpeltata, basi vaginata; laminae submersae sagittatae, laminae fluitantes elongato-ellipsoideae, sinu basali ornatae; nervi basales 2, venatione reticulata. *Flores* solitarii axillares pedunculati actinomorphi hermaphroditi. *Perianthium* 4-verticillatum sepaloideum. *Stamina* 15, alterna, in ovarii parte superiori inserta, filamentis late petaloideis; antherae thecis duabus latrorsis; connectivum processu apicali exemptum. Pollen operculatum. *Ovarium* superius, syncarpum, 3—5-loculare, lobis stigmaticis 3—5, stellatim positis circum depressionem angustum profundum, depressione axem floralem sterilem prolongatam emittente. Ovula numerosa anatropa pendula, e placentis lamellatis. Bacca ovoidea. *Semina* numerosa globosa operculata, exarillata, endospermio pauco, perispermio copioso. Embryo recta. Typus atque species unica: *Ondinea purpurea* den Hartog, species nova.

Distribution: North-western part of Australia.

Note: The genus is named after Ondine, a long since forgotten water-spirit which has been brought to life again in Ashton's ballet of the same name.

Ondinea purpurea den Hartog, *nov. sp.* — **Fig. 1.**

Tuber erect, oblong, 15—25 by 7—17 mm, covered at the top with fine fibrous hairs. *Roots* descending from the upper part of the tuber, *ca.* 6—10 cm long and 1—1½ mm thick, unbranched or with a few very small lateral branches; diaphragms at intervals of *ca.* 1 mm. *Petiole* 10—40 cm long, 1 mm thick, continuing in the leaf as a midrib, attached to the lower side of the leaf, sheathing at the base. *Submerged leaf-blade* sagittate, thin, translucent, glossy, yellowish green on the upper surface, often more or less purplish brown on the under side, with entire undulate margin; median lobe obtuse or emarginate, with a very small median mucro, caused by the opening of the midrib, 6½—11 cm long (measured along the midrib) and 1¾—2½ cm wide; lateral lobes obtuse, 3½—5(—6) cm long and 1—1½ cm wide; sinus between lateral lobes 45—90°; main nerves on the upper surface grooved, lower part of the midrib projecting as a ridge on the under surface; nerves of lower order

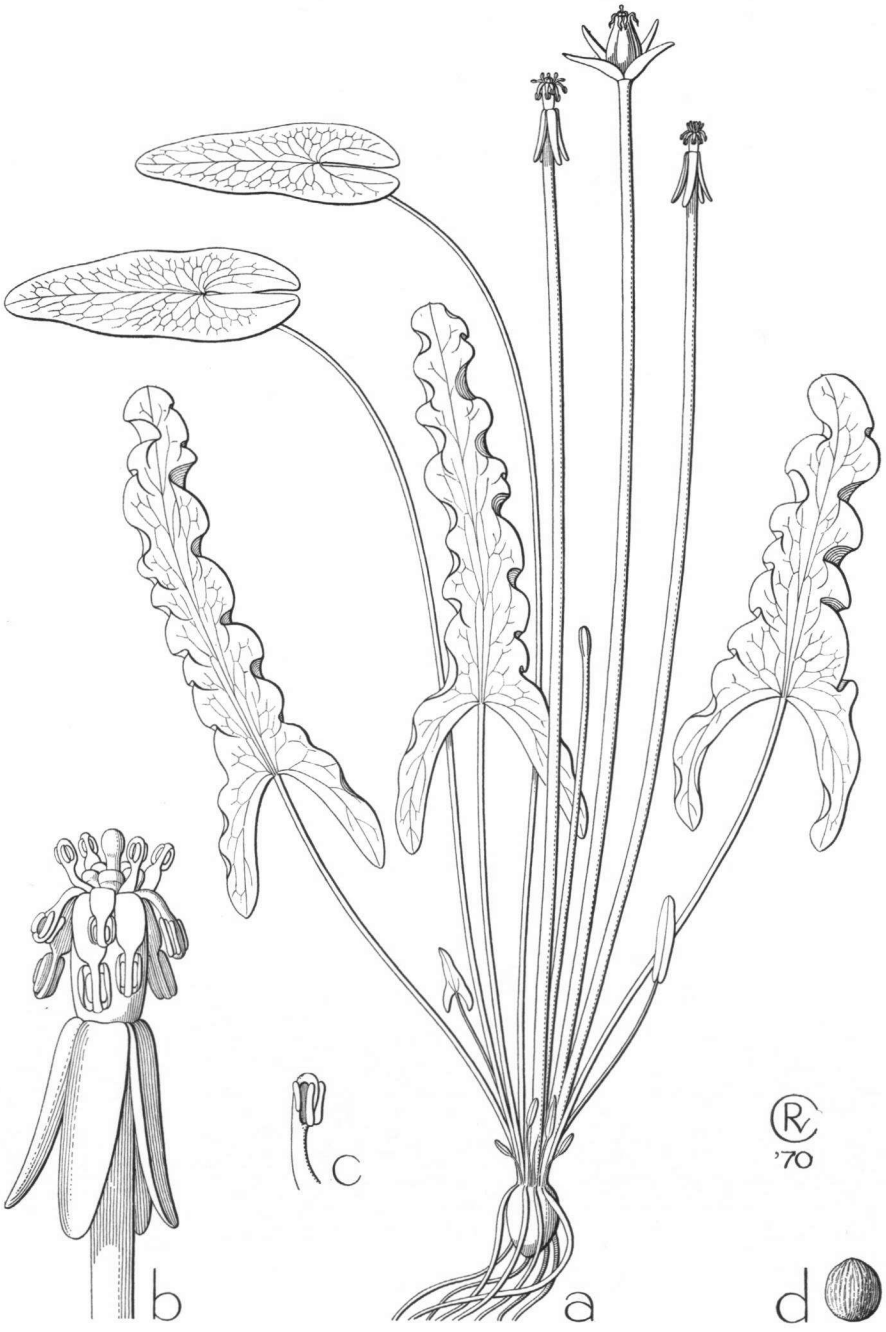

Fig. 1. *Ondinea purpurea* den Hartog. — a. Habitus (× ½); b. flower (× 2½); c. stamen, lateral view (× 2½); d. seed (× 5). (all from *W. Leutert 108*, type.)

arranged in a somewhat reticulate pattern; on the epidermis of upper and lower surface many very small papillae close to main nerves and secondary nerves; papillae sparsely distributed on other parts of the leaf-blade. *Floating leaf-blade* elongate-ellipsoid, coriaceous, bright light-green on the upper surface and purplish on the under side with entire, slightly undulate margin, *ca.* 7 cm long and 2 cm wide; basal sinus 2—2¼ cm long; basal lobes overlapping or almost overlapping; upper epidermis with a thick cuticle and many stomata, hydrophobous, under surface hardly cuticularized and without stomata, nervation principally the same as that of a submerged leaf. *Peduncle* terete, smooth, longitudinally grooved when dry, with numerous fine papillae, pale pink when alive, with numerous longitudinal tannin stripes especially in its lower part, 20—35 cm long, emerging up to *ca.* 10 cm above the water-level. *Sepals* 4, linear or slightly spatulate, 9—17 mm long, 1½—3 mm wide (*ca.* 6 times as long as wide), obtuse, slightly convex, papillose, reflexed during anthesis, spreading when in fruit; adaxial surface purple, abaxial surface pink (more or less the same colour as the peduncle); venation parallel, midvein somewhat more conspicuous than the others. *Stamens* 15, on the upper part of the ovary, diminishing in size towards the stigma, at first curved over the top of the ovary, later reflexed and hanging downwards; filaments foliose, with distinct midvein and sometimes even with 3 veins, oblong or linear, often spirally coiled, 1—6 mm long, purple; anthers consisting of 2 lateral, biloculars, latrorsely dehiscent, 1—2 mm long thecae, separated by a wide connective, connective purple, forming an entirety with the filament. *Ovary* oblong-ellipsoid, 5—9 mm long, brigtht pink; lower part of the abaxial ovary wall (4—7 mm) between the sepals and the lowermost stamens smooth; stigmatic lobes 3—5, *ca.* 1 mm high, bright dark red, papillose, the abaxial side without papillae; central depression *ca.* 1 mm deep. *Floral axis* 2½—3 mm long, with a conspicuous apical knob, yellow, emerging 1½—2 mm above the stigma. *Fruit* 14—17 mm long and 8—11 mm wide, dark purple, often with some filament remnants and crowned by the yellow floral axis. *Seeds ca.* 1 mm in diameter, when liberated from the fruit sinking to the bottom; testa membranous, brown, with a very fine longitudinal striation (only visible at hight magnification).

WESTERN AUSTRALIA: Kimberley district, Kurunundalo or Kurunundalu, 3 miles North-East of Kalimburu (126° 40′ E, 14° 15′ S), 15-4-1968, *W. Leutert 108* (CANB, 6 sheets; I have indicated the plant on sheet no. 3 as the type specimen); Creeks near the Prince Regent River, 6-6-1921, *C. A. Gardner 1353* (PERTH, 1 sheet); Prince Regent River, Lushington Creek, 3-7-1950, *C. A. Gardner 9561* (PERTH, 3 sheets).

Ecology: Ondinea purpurea occurs in small rivulets of 15—60 cm depth, the beds of which only carry water for 5—7 months a year. According to the field notes of Leutert the beds at Kurunundalo contain water from January to the end of May, and are absolutely dry between May and December. In the region of the Prince Regent River Gardner collected the species as late as June and July. During the dry period the plants disappear completely and aestivate as subterranean tubers. According to Leutert new tubers are formed above the old ones as growth is resumed. He found the tubers at a depth of 30—45 cm in the sandy bottom. This means that the complete herbarium specimens which I had at my disposal were shallowly rooting plants, thus the measurements of the petioles and peduncles as given in my description relate to those of small-sized specimens.

Leutert suggested that it is most likely that the flowers of *O. purpurea* are cleistogamous. In my opinion the bright colours of the sepals, stamens, stigma, and floral axis, as well as the reflexion of the stamens which exposes the stigma and the floral axis seem to point to insect pollination. The latrorse position of the anthers makes autogamy rather improbable.

THE POSITION OF ONDINEA IN THE NYMPHAEACEAE

The genus *Ondinea* is closely related to *Nymphaea*, in fact it is closer to *Nymphaea* than to any of the other genera within the *Nymphaeaceae*. In general the *Ondinea* flower can be regarded as an apetalous *Nymphaea* flower. However, the absence of a corolla is not the only floral character which distinguishes *Ondinea* from *Nymphaea*. The stamens of *Ondinea* have latrorse anthers, while those of *Nymphaea* have introrse ones. The stigma of *Ondinea* consists of 3—5 laterally fused papillose lobes, radially arranged around a central depression from which the prolonged sterile floral axis arises; the stigmatic lobes do not form a disc as in *Nymphaea*, and also have no abaxial processes ('carpellary styles'). The floral axis in *Ondinea* is a conspicuous organ, emerging above the stigmatic lobes, while in *Nymphaea* it is the ovoid, spherical, linear, or conical centre of the stigmatic disc. Further the seeds of *Ondinea*, in contrast to those of *Nymphaea*, do not have an aril. The shape of the submerged leaves may possibly be regarded as a generic character; these are sagittate in *Ondinea*, but more or less cordate in *Nymphaea*. Deltoid or hastate submerged leaves are in *Nymphaea* only known as the earliest leaves produced by seedlings of a few species, not as mature leaves.