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Narcissus ×*perezlarae* (Amaryllidaceae) new for the Portuguese flora

Abstract

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Narcissus ×*perezlarae* Font Quer is a natural hybrid between *N. cavanillesii* A. Barra & G. López and *N. serotinus* L, two autumnal flowering geophytes. Although scarce populations had been found in Spain since 1882, in the areas where the distribution of the two parental species overlaps, this is the first report of this taxon in Portugal. *N. ×perezlarae* was found in the context of conservation projects regarding the effects of the Alqueva dam in vascular plants, especially on *N. cavanillesii*, a species considered as Critically Endangered (CR) in Portugal. Its history, morphology, ecology and distribution is here illustrated as well as a brief discussion concerning the evolutionary implications of the presence of *N. ×perezlarae* in Portugal.

Introduction

Narcissus is considered a genus endemic to the Mediterranean region, presenting its highest diversity in the Iberian Peninsula. There is no global consensus concerning the number of species included in this genus but most authors agree in a number between 30 and 70 species (Fernandes 1975; Blanchard 1990; Barrett et al. 1996; Dobson et al. 1997). A recent review reports a number of 43 species endemic to the Iberian Peninsula (Moreno Saiz & Sainz Ollero 1992). This number could even rise if we considered the frequency and importance of natural hybridization in this genus (Fernandes 1951).

Narcissus ×*perezlarae* is a natural hybrid between the two autumnal geophytes, *N. cavanillesii* A. Barra & G. López and *N. serotinus* L. Although *N. serotinus* occupies a large distribution area along the Mediterranean coast, between Portugal and Turkey, *N. cavanillesii* is restricted to SE Portugal, SW Spain and NW Africa (Fernandes & Fernandes 1945; Fernandes 1969; Malato-Beliz 1977; Rosselló-Graell et al. 2003).

Due to the building of the Alqueva dam (Alentejo, Portugal) field studies were performed in order to evaluate the impact of the dam's reservoir on some populations of vascular plant species (Ballester-Hernández et al. 2000). This artificial lake will be the biggest of this kind in Europe and will cover 25,000 ha of land in the Guadiana basin, 86% in Portugal and the remaining in Spain. The Portuguese Guadiana basin is a rich botanical

area with 550 species of vascular plants, 97 of which with conservation importance in Portugal (Capelo 1996; Draper et al. 2003), namely *N. cavanillesii* considered as Critically Endangered (CR) according to IUCN (2001) categories (Rosselló-Graell et al. 2003). During the fieldwork performed in this context, *N. ×perezlarae* was recorded for the first time in Portugal.

Background history

Narcissus ×perezlarae was first found in 1882, in Jerez de la Frontera (Spain), and described by Pérez Lara as a new species under the name of *Carregnoa dubia* (Pérez Lara 1882). Only two specimens were collected and, doubting the origin of this taxon, Pérez Lara sent one specimen to Willkomm who confirmed this taxonomic identification. Later Willkomm himself (1883-1884), publishing a drawing, suspected that the plant could be a hybrid between *N. cavanillesii* and *N. serotinus* but he rejected this supposition based on the articulated scape, "the most surprising character of this plant that do not exist in any other european Amarilideae" (Willkomm 1883-1884).

Years after, Font Quer reviewed the herbarium material and proposed the hybrid origin for this taxon (Font Quer 1927). The following floral characters intermediary between *N. serotinus* and *N. cavanillesii* were essential to support its proposal: the form of the perianth, the yellow colour of the flowers, the division of the corona into six small scales and the stamens position. The rarity of the taxon and its presence among the two parental species also sustained Font Quer opinion. The articulate scape pointed out by Willkomm as exclusive to this taxon was also reported by Font Quer for other *Amaryllidaceae*, namely the parental species (Font Quer 1927). Willkomm also compared the hybrid with *N. cavanillesii* and stated that the latter in the flowering season had leaves at least as large as the scape (Willkomm 1883-1884; Font Quer 1927). But, in fact the species generally does not develop leaves in that period. He probably based on the illustration of Cavanilles who designed the leaves as co-existing with the flowers although the author had given notice of this fact in his species description (Cavanilles 1793).

In October 1979, Valdés & Müller-Doblies discovered two new localities near Sevilla (Spain) and confirmed the hybrid origin of the taxon. Some morphological studies were performed involving *N. ×perezlarae* and the parental species, confirming the intermediate characters of the hybrid. The chromosomal number was reported as being of $2n = 29$ for *N. ×perezlarae*, revealing its origin from a natural hybridization process between *N. cavanillesii*, $n = 14$ and *N. serotinus*, $n = 15$ (Valdés & Müller-Doblies 1984). Although they did not comprove the fertility of the hybrid they enhanced the importance of clonal propagation for the persistence of *N. ×perezlarae* (Valdés & Müller-Doblies 1984).

It is worth mentioning that *N. ×perezlarae* is not included in *Flora Europae* (Webb, 1980), as specified by Barra & López González (1982). This taxon does not appear in the *Flora Europae* index though it was reported by Willkomm (1893) in one of the reference books consulted for the elaboration of this work. Though Webb knew the existence of this plant (Webb 1978) and devoted a chapter to intersectional *Narcissus* hybrids (Webb, 1980), he did not consider the presence of this plant.

Among *Narcissus* this taxon highlights by being a hybrid usually present throughout the

Iberian Peninsula together with the parental species and having some ability of persistence employing sexual or clonal reproduction.

Morphology

In the hybridization process between *N. cavanillesii* and *N. serotinus* the hybrids are phenotypically heterogeneous according to the species that acts as female parental (pollen receptor), presenting two morphotypes. The hybrid morphotype in which *N. cavanillesii* has performed as female parental, presents a floral morphology that most resembles this species, with a short perianth tube allowing the exposure of the sexual organs. The other morphotype, with a higher perianth tube and long filaments with the stamens slightly above the corona, presents a floral morphology more similar to *N. serotinus*, which has acted as female parental. This is the hybrid type normally described in flora books. It corresponds to the description first made by Perez Lara (1882) on the specimen sent to Willkomm (Willkomm 1883-1884) and to the taxon studied by Valdés & Müller-Doblies (1984). The colour of the flowers varies between the bright yellow of *N. cavanillesii* and the milky-white of *N. serotinus*.

Ecology

N. ×perezlarae grows on sandy or loamy soils, in disturbed places like road margins with high humidity level. It also exists in open fields dominated by Mediterranean-type scrub communities with *Cistus ladanifer* L., *Chamaerops humilis* L. and *Ulex minor* Roth. In Portugal it is seen co-existing with other autumnal geophytes like *Crocus serotinus* Salisb., *Leucojum autumnale* L., *Scilla autumnalis* L. and *Urginea maritima* (L.) Baker as well as the progenitors *N. cavanillesii* A. Barra & G. López and *N. serotinus* L.

Normally it forms small isolate patches with the flowering bulbs presenting scented flowers with a floral shape different from the parental species. *N. serotinus* flowers have a narrow and long perianth tube that hides the sexual structures differing from *N. cavanillesii* ones which have a very short tube that allows a total exposure of the reproductive organs. Thus, depending on the morphotype, *N. ×perezlarae* presents a short or long perianth tube, as previously referred. However, in both types the sexual organs are excluded, easily receiving and releasing pollen. Fig. 1 illustrates the differences regarding in the floral morphology of these taxa.

Distribution

N. ×perezlarae was considered endemic of Cádiz and Sevilla provinces (Valdés & Müller-Doblies 1984; Galán de Mera 1994; Roales 1999) until it was recently discovered in the Valencian Community (Soller 1998) extending its distribution to the SE of the Iberian Peninsula. In 2001, during fieldwork carried out in Alentejo region this hybrid taxon, *N. ×perezlarae*, was recorded for the first time in Portugal, in the following two localities near the Guadiana river, co-existing with the parental species:



Fig. 1. Distinct floral morphology presented by the parental species and the two morphotypes of the hybrid taxon: A. *N. cavanillesii* with an inconspicuous corona and a short perianth tube with excluded sexual structures; B. *N. serotinus* with a cup shaped corona and a long perianth tube concealing the sexual organs; C. *N. \times perezlarae* morphotype *cavanillesii* with a short corona and a short perianth tube; D. *N. \times perezlarae* morphotype *serotinus* with a narrow perianth tube but also excluded sexual organs.

***Narcissus* ×*perezlarae* Font Quer**

POR: Alto Alentejo, Elvas, Ponte da Ajuda, Tabuleiro da Ponte da Ajuda, Solo ácido, Ocorrência junto dos parentais, 161m, 29SPC5993, 5 Out 2001, David Draper & Isabel Marques, (LISU 181995).

- Alto Alentejo, Alandroal, Montes Juntos, Monte Novo de Cima, Herdade da Defesa, Leito de cheia do rio Guadiana, Ocorrência junto dos parentais, 127m, 29SPC4664, 6 Out 2001. David Draper & Isabel Marques, (LISU 181996).

The Portuguese localities reported above extend the distribution area of this taxon to the SW of the Iberian Peninsula. It is worthy of notice that although *N. serotinus* has a larger distribution area in Portugal, *N. cavanillesii* is reported only from these same two localities (Rosselló-Graell et al. 2003).

Evolutionary importance

The evolutionary importance of natural hybrids is a rather controversial question. The prevailing point of view was that hybridization is of no evolutionary consequence because crosses between genetically divergent individuals would result in the production of infertile or unviable offspring (Roberts 1929; Zirkle 1935; Mayr 1963). A more recent opinion is that natural hybridization is a potentially creative process (Arnold, 1997; Rieseberg, 1997; Carney et al. 2000). The reproductive fitness plays a crucial role determining the consequences of the evolutionary process (Rieseberg & Carney 1998; Schweitzer et al. 2002).

A study concerning the fitness of the Portuguese hybrid populations demonstrates that some individuals are fertile producing viable seeds. Preliminary reports revealed that the young hybrid seedlings present a higher vigour than the parental seedlings. Although the initial success of the hybrids could be low, some genotypes may be more adapted than the parental ones (Arnold et al. 1999; Hauser et al. 2003). Contrary to its creative role, hybridization could lead to the extinction of one or both parental species (Antilla et al. 1998). Interfering with the population growth of a rare taxon, namely the ability to replace itself, the hybrid could jeopardize its extinction (Ellstrand 1992; Levin et al. 1996). Taking into account these facts and considering that a conservation project was created in Portugal involving the two parental geophytes, a monitoring program was initiated in order to follow the development of the Portuguese hybrid populations. Some studies have been started to evaluate the influence of *N. ×perezlarae* on the parental species, namely on *N. cavanillesii*.

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