



# ***Crepis novoana* (Asteraceae), a new species restricted to coastal cliffs in northern Galicia (northwest Iberian Peninsula)**

SANTIAGO ORTIZ F.L.S., XAVIER SOÑORA AND JUAN RODRÍGUEZ-OUBIÑA F.L.S.

*Laboratorio de Botánica, Facultade de Farmacia, Universidade de Santiago, 15706 Santiago de Compostela, Galicia, Spain*

Received January 1996, accepted for publication August 1996

A new species of the section *Lepidoseris* (Rchb.) Benth. of the genus *Crepis* L. (Asteraceae) is described. The new species is restricted to a single known locality on near-vertical coastal cliffs of the Ría de Cedeira in northern Galicia (northwest Iberian Peninsula). Morphometric characters permitting discrimination from the most similar taxa are detailed, and possible phylogenetic relationships with other species of the section *Lepidoseris* (particularly those of the *C. vesicaria* complex) are discussed.

©1997 The Linnean Society of London

ADDITIONAL KEY WORDS:— Compositae – Lactuceae – systematics – taxonomy – endemism – Iberian Peninsula.

## CONTENTS

Introduction . . . . .	147
Material and methods . . . . .	148
Description . . . . .	148
<i>Crepis novoana</i> S. Ortiz, Soñora & Rodr. Oubiña, <i>sp. nov.</i> . . . . .	148
Phenology and seed viability . . . . .	149
Ecology and distribution . . . . .	149
Discussion . . . . .	152
Relationships with similar taxa . . . . .	152
Origin and phylogenetic relationships . . . . .	154
Acknowledgements . . . . .	154
References . . . . .	155

## INTRODUCTION

In the course of a study of the flora of the northernmost part of A Coruña Province (northwest Iberian Peninsula), we found a population of the genus *Crepis* L. on the near-vertical cliffs near Vilarrube on the Ría de Cedeira. Detailed morphological study and comparison with material of similar taxa indicates that the Cedeira specimens are of a new species, which we describe below.

## MATERIAL AND METHODS

Plant species associated with the new species were recorded. To evaluate the viability of the new species in conventional pot culture (Hartmann & Kester, 1994), a total of 80 seeds were collected and planted; of these, 40 were soaked and treated with gibberellins prior to planting. Ten plants were collected and deposited in the SANT herbarium. Specimens of similar taxa from COI, BM, K and SANT herbaria were studied. Mitotic chromosome counts were done on root tips which had been maintained in saturated PDB solution for 2 h, fixed in ethanol and glacial acetic acid (3:1), hydrolysed in HCl at 60°C and then squashed in 2% acetic orcein stain.

## DESCRIPTION

*Crepis novana* S. Ortiz, Soñora & Rodr. Oubiña, **sp. nov.** (Sect. *Lepidoseris* (Rchb.) Benth.)

Biennis in perennem. Folia ex ellipticis ad oblanceolata, integra, dentibus marginalibus generaliter retrorsis, curvatis. INVOLUCRUM cylindrico-campanulatum (7-) 10-12 (-13) × (7-) 9-12 (-20) mm; receptaculum alveolis ciliis albis circumdatis. ACHAENIA biformia, altera fusca, 6-9 × 0.5-0.6 mm, cum rostro 2.5-3.7 mm longo, disposita generaliter in interna capituli parte et altera pallida, 6.5-8 × 0.5-0.7 mm, in apice attenuata, sine rostro, in capituli margine et, aliquando, in eiusdem interiore disposita.

*Type.* A Coruña, Valdoviño, Ría de Cedeira, near Vilarrube. On coastal cliffs. 5.v.1992. Soñora s.n. (SANT, holotype; BM, K, MA, SANT isotypi).

Biennial or perennial. HERB 18-45 cm high. ROOT 2.5-12 mm wide, often woody, thickened in its upper part and often bulbous. STEM 2.5-7 mm wide, often solitary, branched in its upper part or from the basal part upwards, striate, covered with patent glandular or eglandular setose hairs, in some areas interspersed with a very lax adpressed tomentum. LEAVES entire, with eglandular white pubescence; basal leaves (4.5-) 6-10 (-14) × (1-) 2-3 (-4.5) cm, elliptical to oblanceolate, narrowing basally to a pseudopetiole of (0.7-) 1-2 (-4) mm in length, margin with 1-5 mm long teeth, these curved and often retrorse. Median leaves 18-70 × 6-35 mm, lanceolate to oblong-deltate, with base auriculate-amplexicaul, often toothed, especially in the distal third. Upper leaves 4-55 × 1-20, linear-lanceolate, bracteiform, inserted at the base of the peduncles. CAPITULA 10-40 in cymose (to corymbiform) aggregate inflorescences. Principal flowering stems, 3-6 (-8), each with 3-12 capitula on 15-60 mm long peduncles. CAPITULUM (12-) 13-15 (-18) × (7-) 9-12 (-20) mm, cylindrical-campanulate; involucre (7-) 10-12 (-13) mm long, with two rows of bracts which become reflexed at maturity; 7-12 outer bracts mostly situated at the base of the involucre, though some at the apex of the peduncle, (2.5-) 3-5 (-6) × (0.7-) 1-1.5 mm. 1/3-1/2 of the length of the inner bracts, lanceolate, acute to acuminate, brown to greenish, generally with a narrow scarious margin, totally glabrous or with an adpressed tomentum, white at the base and the margins, occasionally with some patent glandular hairs towards the distal extreme of the median nerve, the latter generally inconspicuous; inner bracts (10-) 12-14, lanceolate, (7-) 10-12 × (1-) 1.5-2.5 (-3.5) mm, with acute apex, greenish, with a

scarious margin wider towards the base, with white tomentum adpressed particularly along the margin, and with patent, black, mostly glandular hairs in the area of the median nerve; median nerve conspicuous, and somewhat carinate; axial face of inner bracts with sericeous pubescence due to short whitish hairs. Receptacle with pits ringed by white cilia 0.2–0.5 mm (long). FLOWERS (8–) 10–13 mm long, with ligulate yellow corolla; in marginal flowers, the external part of the ligule is often reddish; corolla tube 2–3.5 × 0.2–0.3 mm, sometimes with short eglandular pubescence or sessile glands; ligule (4.5–) 5–6 (–7) × (0.8–) 1–1.5 (–2) mm, generally covered towards its base with a lax pubescence which may sometimes exceed 1 mm in length. Anthers 3–4 mm long, with sagittate base and obtuse tip; basal anther appendages oblong, acute, 0.3–0.5 mm long. Style-branches 1–2 mm long, green, occasionally yellowish green. ACHENES of two types: type I achenes typically situated in the central part of the capitulum, 6–9 mm × 0.5–0.6 mm, brown, ten-ribbed, spiculate, with a 2.5–3.7 mm beak, which is generally shorter than the 3.5–4.5 (–5.5) mm achene body; type II achenes situated at the external margin of the capitulum or at its centre, 6.5–8 × 0.5–0.7 mm, pale straw yellow, gradually narrowing towards the tip, not beaked or with inconspicuous beak 0.5–1.0 mm long; pappus white, 3.5–4.5 (–5) mm, equalling or slightly overtopping the involucre, comprising 40–50 fine, soft, caducous bristles (Fig. 1). Chromosome number  $2n = 8$  (Fig. 2).

Species named after J. G. Novo, who provided the Latin diagnosis of this and other new taxa described by us.

#### *Phenology and seed viability*

In the wild, flowering occurs during May. Of the 80 seeds collected, none germinated in pot trials. We are currently attempting micropropagation and germination *in vitro* whose results will be published in a different article.

#### *Ecology and distribution*

We know of only one locality for the new species (see Fig. 3). This is quite possibly the only locality, since we have extensively searched the cliffs of this area without finding other populations. The known population occupies a narrow strip of terrain c. 200 m in length, close to Vilarrube on the western shore of the Ría de Cedeira (a ría is a narrow estuarine bay). Within this area, the new species is chasmophytic, associated with plants such as *Armeria pubigera* (Desf.) Boiss., *Crithmum maritimum* L., *Linaria polygalifolia* Hoffmanns. & Link subsp. *aguillonensis* (García-Martínez) Castroviejo & Lago, *Spergularia rupicola* Lebel, *Koeleria glauca* (Schrader) DC. and *Leontodon taraxacoides* (Vill.) Mérat. In terms of Zurich-Montpellier phytosociology, the new species forms part of halo-chasmophytic communities of the association *Crithmo-Armerietum pubigerae*, which is frequent on cliffs in the northwest Iberian Peninsula (Ortiz & Rodríguez-Oubiña, 1993). In terms of the phytoclimatic zonation of Rivas-Martínez (1987), the new species occurs in the Eucolino sub-belt of the Colino (Hill) belt of the northern subsector of the Galaico-Asturiano sector (Cantabro-Atlántica province, Eurosiberian region).

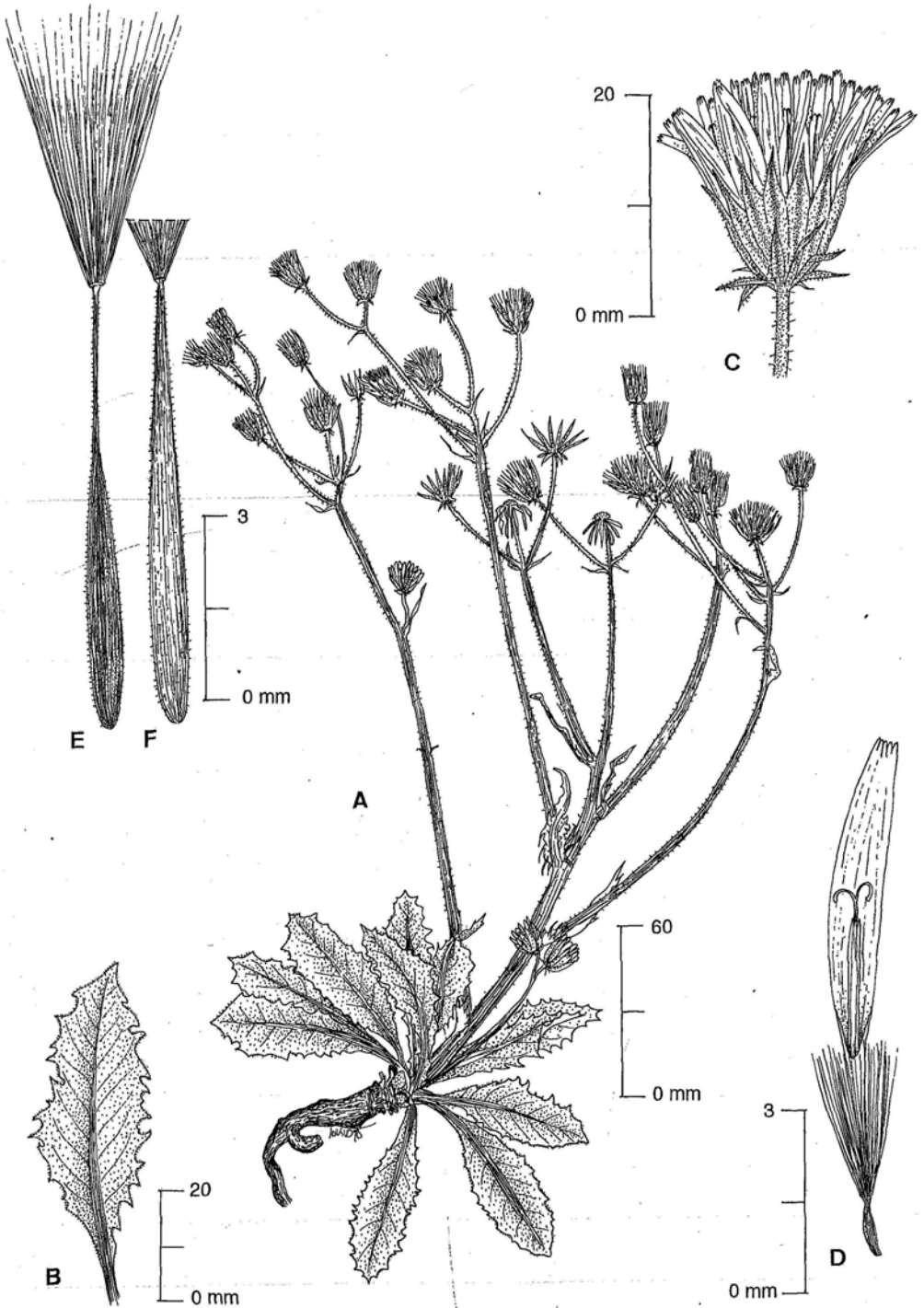


Figure 1. A, habit. B, basal leaf. C, capitulum. D, floret. E, beaked achene. F, unbeaked achene. Based on holotypus.



Figure 2. Micrograph of a squash preparation of *Crepis novoana* root-tip cell at metaphase, showing chromosome number  $2n = 8$ .

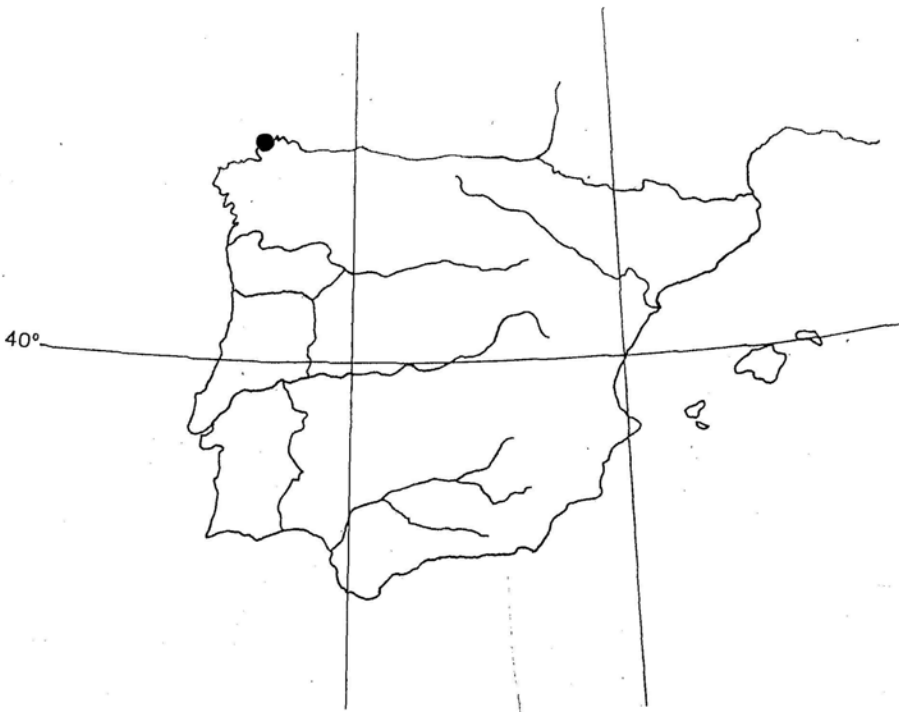


Figure 3. Map showing the single known locality for *Crepis novoana* in Galicia (northwest Iberian Peninsula).

TABLE 1. Principal morphometric differences between *Crepis novoana* and the most similar taxa. Data for *C. balliana* (of which only a single incomplete herbarium specimen exists, in K) are according to Babcock (1947). Data for other species are according to Babcock (1947), Marceno *et al.* (1991) and own data. OBL=outer bract length; IBL=inner bract length; RP=receptacular pit; BAA=basal anther appendage; NB=non-beaked; wt=with respect to

Characters/species	<i>C. vesicaria</i>		<i>C. balliana</i>
	<i>C. novoana</i>	subsp. <i>vesicaria</i>	
Leaf shape	entire, elliptical to oblanceolate	entire or partite, oblanceolate to obovate	entire, oblanceolate
Leaf size (cm)	4.5-14 x 1-4.5	10-15 x 2-3	10 x 2.5
Involucre size (mm)	7-13 x 7-20	8-14 x 4-8	8 x 3
Outer bract shape	lanceolate	ovate	lanceolate
Outer bract arrangement	non-imbricate	imbricate	non-imbricate
Outer bract size (mm)	2.5-6 x 0.7-1.5	4-9 x 3-5	?
OBL/IBL	1/3-1/2	1/3-2/3	1/3
RP cilia length (mm)	0.3-0.5	0.2-0.3	?
RP cilia abundance	abundant	scarce	?
BBA length (mm)	0.3-0.5	0.5-0.7	?
Style-branch length (mm)	1-2	2-2.5	?
Position of NB achenes	marginal and central	marginal	marginal
Length of NB achenes (mm)	6.5-8	4-8	5-5.5
Achene beak length wrt achene length*	shorter	equal or shorter	shorter

\*Data for achene beak length are for type I achenes.

not occur in the northwest Iberian Peninsula; however, it should be pointed out that *C. vesicaria* subsp. *haenseleri* does occur in this region, though it has not been reported from any locality west of southeast Galicia (Merino, 1906; Ortiz, 1987; Jiménez de Azcárate & Amigo, 1996). None of the heterocarpic subspecies of *C. vesicaria* extend anywhere near the northwest Iberian Peninsula.

### *Origin and phylogenetic relationships*

In his exemplary 1947 monograph, Babcock argues that non-rhizomatous heterocarpic species of *Crepis* with a chromosome number of  $2n = 8$  (i.e. species of the section *Lepidoseris*) are phylogenetically advanced. Babcock suggests that phylogenetically advanced restricted-range species of *Crepis* (particularly those of the section *Neumachenes*, from the Mediterranean region) arose from lineages which originated in Central Asia and which reached the Atlantic coast towards the end of the Pliocene and the beginning of the Pleistocene. This assertion appears to be based on the fact that the Atlantic-coast endemics of the section *Lepidoseris* are perennial and on the assumption that the species of *Lepidoseris* are more primitive than the species of *Neumachenes*. However, the heterocarpy of *C. novoana*, like that of *C. balliana*, is — according to Babcock — an advanced character, and suggests that species of the section *Lepidoseris* (such as *C. novoana*, *C. divaricata* (Lowe) F.W. Schultz and *C. vesicaria* subsp. *andryaloides* (Lowe) Babc. from Madeira and the nearby islands, *C. fontina* Babc. ex Maire, *C. bourgeau* Babc. and *C. balliana* Babc. from northwest Morocco) reached the Atlantic coast via Mediterranean populations which expanded during extended cold dry periods (probably during the last glaciation) and subsequently became less viable — in some cases to the extent of becoming extinct, as in *C. balliana* — when the climate became wetter. In our opinion, this hypothesis accords better with the present-day distributions of these species than the hypothesis of Babcock (1947). A similar hypothesis was recently proposed by García Jacas & Susanna (1993) to explain the origins of *Centaurea borjae* Valdés Berm. & Rivas Goday and *Centaurea ultreiae* Silva Pando, two endangered taxa likewise restricted to very limited areas in northwest Galicia; indeed, the area of distribution of *Centaurea borjae* (likewise a species of coastal cliffs) is very close to that of *Crepis novoana*. Both *Centaurea borjae* and *Centaurea ultreiae* are of the section *Acrocentron* (Cass.) DC., which is basically Mediterranean in distribution. The perennial strategy of the Atlantic-coast endemics of the section *Lepidoseris* may reflect a secondary adaptation to this region's climate (milder and wetter than that of the Mediterranean region), and is in accordance with Babcock's (1947: 64) assertion that the species of this section are variable as regards the lifespan of individual plants.

### ACKNOWLEDGEMENTS

We thank J.G. Novo for the Latin description, Alfredo López (Tokyo) for the illustration, and G.J. Norman for translation of the manuscript to English. The work was partly financed by the Dirección Xeral de Universidades e Investigación, Xunta de Galicia (project XUGA 20315B94).