ON THE PRESENCE OF DIPLOID AND TETRAPLOID FORMS OF *HORDEUM BULBOSUM* L. IN SPAIN

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Abstract

ORTIZ, L., A. GONZÁLEZ & M. C. CHUECA (1985). On the presence of diploid and tetraploid forms of Hordeum bulbosum L. in Spain. *Anales Jard. Bot. Madrid* 41(2):361-365.

Tetraploid forms of *Hordeum bulbosum* L. are reported for the first time in Spain. Coexistence of both tetraploid and diploid forms is established for the south of Spain.

Resumen

ORTIZ, L., A. GONZÁLEZ & M. C. CHUECA (1985). Sobre la presencia de formas diploides y tetraploides de Hordeum bulbosum L. en España. *Anales Jard. Bot. Madrid* 41(2):361-365 (en inglés).

Se citan por primera vez en España formas tetraploides de *Hordeum bulbosum* L. Se establece la coexistencia de las formas diploides y tetraploides en el sur de España.

INTRODUCTION

The finding of genetic variability is a very important aim in plant breeding programmes, and breeders have to look for new gene sources within wild species related to cultivated plants. Hence, the collection of wild plants and their evaluation is an usual and essential practice in plant breeding.

Hordeum bulbosum L. is one of the species commonly used in barley breeding programmes, because it is a good gene donor for resistance to drought (WHYTE & *al.*, 1959) and to *Erysiphe graminis* (JONES & PICKERING, 1978; SZIGAT & POHLER, 1982). Besides that, it has an important rôle in the chromosomic elimination process when it is crossed with *Hordeum vulgare* (LANGE, 1968; SYMKO, 1969; KASHA & KAO, 1970). Therefore, *H. bulbosum* is of great interest in obtaining haploids, which is a fast way of obtaining new varieties by duplicating the haploids previously obtained (HO & JONES, 1980). This is the reason for collecting new *H. bulbosum* genotypes.

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MATERIAL AND METHODS

H. bulbosum seeds collected from 38 different sites in southern Spain were examined. Chromosome counts were made on root-tip meristems of primary roots by the Feulgen method. The steps followed have been detailled previously (CHUECA & CAUDERON, 1977).

RESULTS AND DISCUSSION

In 1981 we carried out a prospection in the southern half of Spain in order to collect wild species of *Hordeum, Triticum* and *Aegilops*. The prospected arèa appears dotted in the map (fig. 1). It corresponds to the east and west of Andalusia, the south of Extremadura and part of the Spanish Mediterranean area. *H. bulbosum* samples were collected from 38 populations, all of them from Western Andalusia. Sites of collections are listed on table 1 and in the map (fig. 2).

As far as it is known, *H. bulbosum* grows in various types of soil, from acid to basic ones, in altitudes between sea level and 2400 m, on road sides, waste places, edges of cultivated fields and even as a weed (JØRGENSEN, 1982). It is therefore not very likely that its distribution would be affected by the type of soil.

TABLE 1

Geographic situation and chromosome number of the 38 accessions collected and tested.

Collection Number	Collecting site	Province	Cromosome Number (2*n*)
50; 51	Bujalance	Córdoba	14
53; 54	Puebla de los Infantes	Sevilla	14
52	Puebla de los Infantes	Sevilla	28
55	Carlota	Córdoba	14
56	Paterna de Rivera	Cádiz	14
57; 66; 67	Torre Megarejo	Cádiz	14
58; 59; 63; 64	Arcos de la Frontera	Cádiz	14
60; 61	Venta Nueva	Sevilla	14
62; 65	Espera	Cádiz	14
68; 69; 70; 71	Jedula	Cádiz	14
72	Laguna de Valdetojo	Sevilla	14
73; 74	Baños de Gigonza	Cádiz	14
75	Venta del Cuervo	Sevilla	28
76; 77; 78; 79; 80; 81; 82; 83	Venta del Cuervo	Sevilla	14
84	Laguna de la Paja	Sevilla	14
85; 86	Conil de la Frontera	Cádiz	14
86	Algeciras	Cádiz	14
88	Sierra del Torcal	Málaga	14
89	Jerez de la Frontera	Cádiz	14

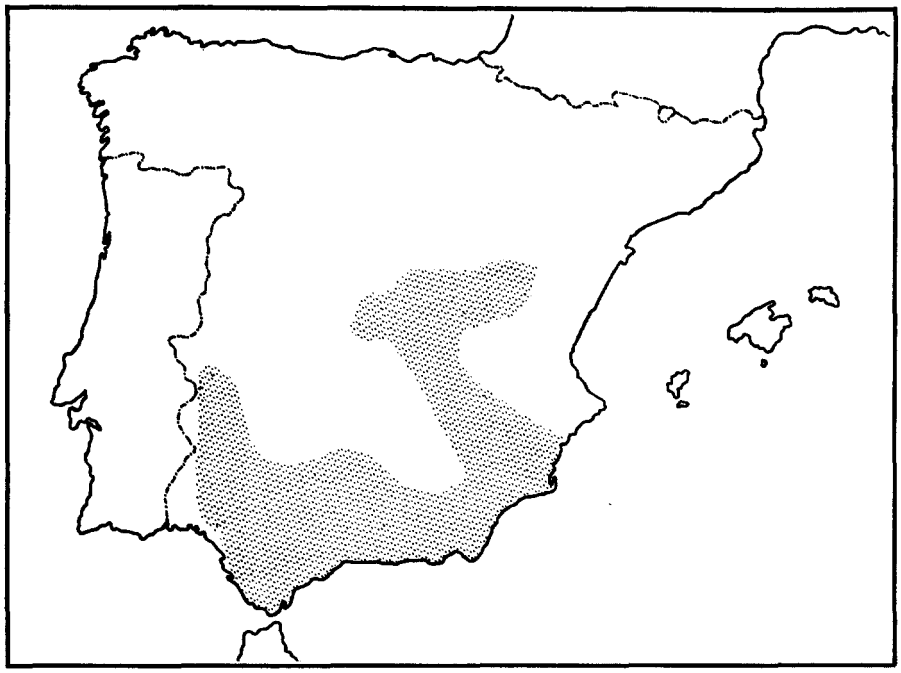

Fig. 1.—Prospected area in the search of *Hordeum bulbosum*.

Fig. 2.—Distribution of *H. bulbosum* in the prospected area. (● diploid cytotype; ∗ tetraploid cytotype).

Rainfall is a factor that can play and important rôle in the distribution of this species. Witch can stand long periods of drought and heat, although it has not been found in Spain in places where the rainfall is less than 400 mm.

The chromosome number of these populations was determined; 36 of them were diploids ($2n=14$) and 2 tetraploids ($2n=28$). This is the first report of tetraploid forms for the Iberian Peninsula. Tetraploid forms were found together with diploid ones. Specimens are included in the herbarium of the «Facultad de Biología de Madrid» (Spain) with numbers: MAC 9460 (diploid form) and MAC 9459 (tetraploid form).

The distribution of cytotypes is not uniform. Diploid forms occur in Central and Western Europe, whereas tetraploid ones cover the rest of the growth area of this species. In Greece both forms appear (JØRGENSEN, 1982); diploids have also been found in North Africa and Mauritania. A tetraploid form has been reported from France (CAUDERON & CAUDERON, 1956).

JØRGENSEN (1982) found a triploid *H. bulbosum* in Spain, pointing out that it could have been produced either from an unreduced diploid gamete or from a cross between a diploid genotype and a tetraploid one.

Our finding of two tetraploid forms growing together with diploid ones in the same place, supports the second of Jørgensen's hypothesis.

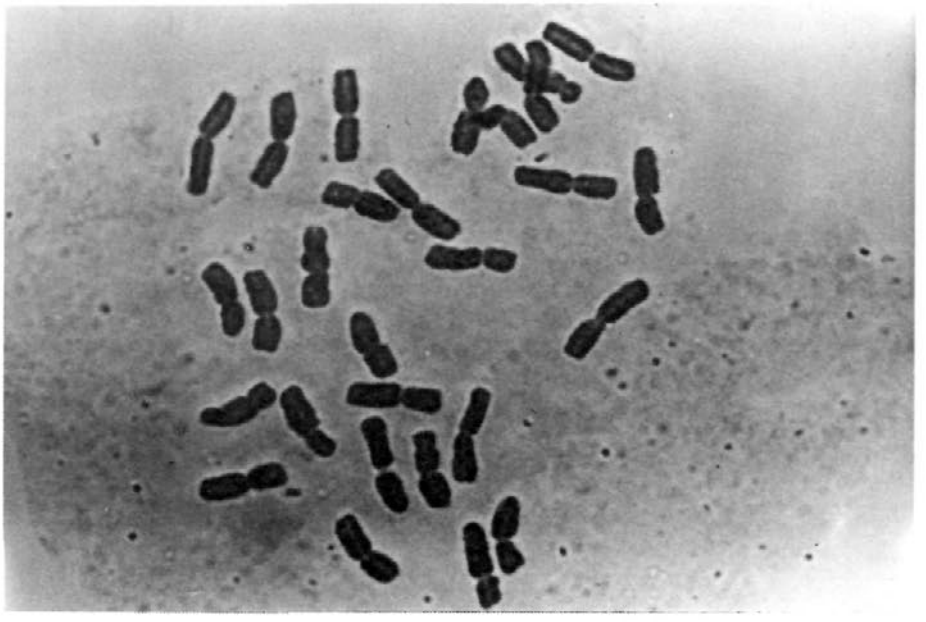

Fig. 3.—Somatic metaphase of tetraploid *H. bulbosum* ($2n=28$).

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