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# HOW TO LOOK AT A PLANT IN ORDER TO RENDER A SCIENTIFIC ILLUSTRATION

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**Abstract**

Scientific illustration is the accurate depiction of objects and concepts in science; therefore the eye of the scientific illustrator must go beyond the ability to render an attractive drawing. The scientific illustrator must communicate research results in a way that is appealing and useful to the scientist. In this work, scientific illustration was applied to the depiction of two Leguminosae species: *Astragalus massiliensis* (Miller) Lam. subsp. *vicentinus* (Samp.) Díaz et al and *Dorycnium hirsutum* (L.) Ser. var. *prostratum* Jord. & Fourr. from S. Vicente cape, Portugal. They are present in two different habitats of Southwest Littoral Natural Park (P.N.S.A.C.V.). This work includes black and white illustrations of plant morphology and representations of habitat. Different rendering techniques and fundamental procedures are used in these two types of illustration.

## Introduction

Vascular plants from Vicentina coast, Portugal, are extremely peculiar. This protected area includes a number of diverse environments and landscapes of unique composition, therefore it is important to record the threatened biodiversity of this territory, especially rare and endemic plants.

In this work, scientific illustration was applied in the depiction of: *Astragalus massiliensis* (Miller) Lam. subsp. *vicentinus* (Samp.) Díaz et al. and *Dorycnium hirsutum* (L.) Ser. var. *prostratum* Jord. & Fourr. from S. Vicente cape, Portugal. The selection of these two Leguminosae taxa allows both to show some typical habitats of the area, and to illustrate ecological divergence inside a family.

## The scientific illustration

Scientific illustration is the accurate depiction of objects and concepts in science, allowing the presentation of information in a way that is appealing and useful to the scientist (WOOD, 1994; HODGES, 1989). Its main purpose is to help the scientist-author to communicate. Illustration eliminates the ambiguities of language and communicates subtleties. The training and ability of the scientific illustrator must reach both science and art, applying discipline to creativity (HODGES, 1988).

### Botanical illustration

The botanical illustrator should have knowledge of plant morphology, anatomy, and taxonomy, in order to understand plant structure and the relationships within and among

plant groups. The illustrator must know the conventions of the science for which he is working, must know both how to use a herbarium and to handle pressed specimens, and how to locate information about the subject at hand (HODGES, 1988). The illustration must reflect both a scientific and artistic view of the specimen (BLUNT, 1967).

**Illustrating plants**

In this work are presented two plates concerning the morphology of *Astragalus massiliensis* (Miller) Lam. *subsp.vicentinus* (Samp.) Díaz et al. (Fig. 1), and *Dorycnium hirsutum* (L.) Ser. var. *prostratum* Jord. & Fourr. (Fig. 3), and their respective habitats (Figs. 2 and 4). These illustrations were done in black & white and with pen & ink, a rendering technique that ensures optimal reproduction quality, allows accurate detailing, and is the least expensive to print (WOOD, 1994; HODGES, 1988).

The drawings were prepared from observations of specimens collected in S. Vicente cape, Sagres, Portugal. *Dorycnium hirsurum* var. *prostratum* was collected in platforms with xerophytic scrubs on tertiary sands at 50 m altitude; *Astragalus massiliensis* subp. *vicentinus* was collected in cliffs and platforms with xerophytic scrubs exposed to the wind, on limestone and terra rossa at 50 m altitude (RÍVAS-MARTÍNEZ & al, 1990a,b). The specimens were collected during the period March - September 1994. Bibliographic research related to morphological and taxonomic aspects, and observations of specimens herborized, were done in the herbarium of the "Museu, Laboratório e Jardim Botânico da Faculdade de Ciências de Lisboa (L.I.S.U.)".

**Illustrating plant morphology**

The plates referring to plant morphology include a drawing of the habit surrounded most times by a detail of stems, and by fundamental structures for identification. The preliminary drawings are rough but detailed sketches, done after a previous study of plant taxonomy and morphology (HODGES, 1988). They were rendered with graphite pencils and prepared from sketches of living, freshly cut, or pressed and dried specimens, photographs, and photocopies of pressed specimens. A Pentax k1000 (50 mm lens and macro) and 35 mm films in black & white and colour, were used. Details were drawn using both a stereoscope Wild 500 with camera lucid TYP 308700, and slides. A special relevance was given to the observations of morphological structures that are fundamental for identification of the taxa. After being checked by the scientist, the preliminary drawing was transferred to a transfer sheet and then to the final surface. The final illustration was rendered with Gillot 170 nib, a no. 16 X-acto blade, a Hunt 113 blade, and black Indian ink on white scratchboard. The scratchboard is a white coated surface. It was possible to draw with lines and stipples in positive - black, or negative by scratching areas painted black. Dots and lines were used to suggest texture and volume (HODGES, 1988; CUTLER, 1977).

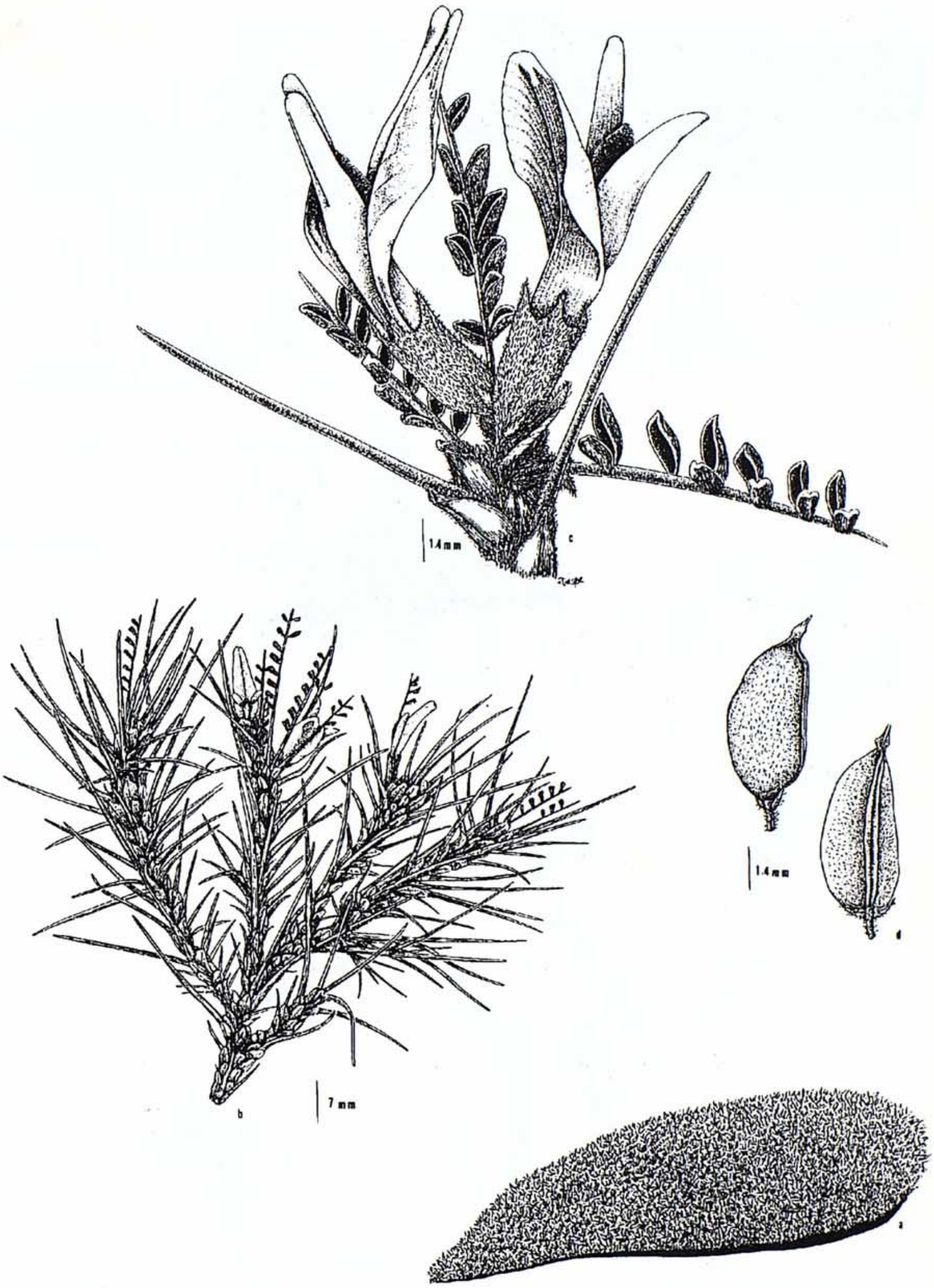


Fig. 1. *Astragalus massiliensis* subsp. *vicentinus*: a, habit; b, detail of the stems; c, inflorescence; 4, legume.

Fig. 2. Habitat of *Astragalus massiliensis* subsp. *vicentinus*.

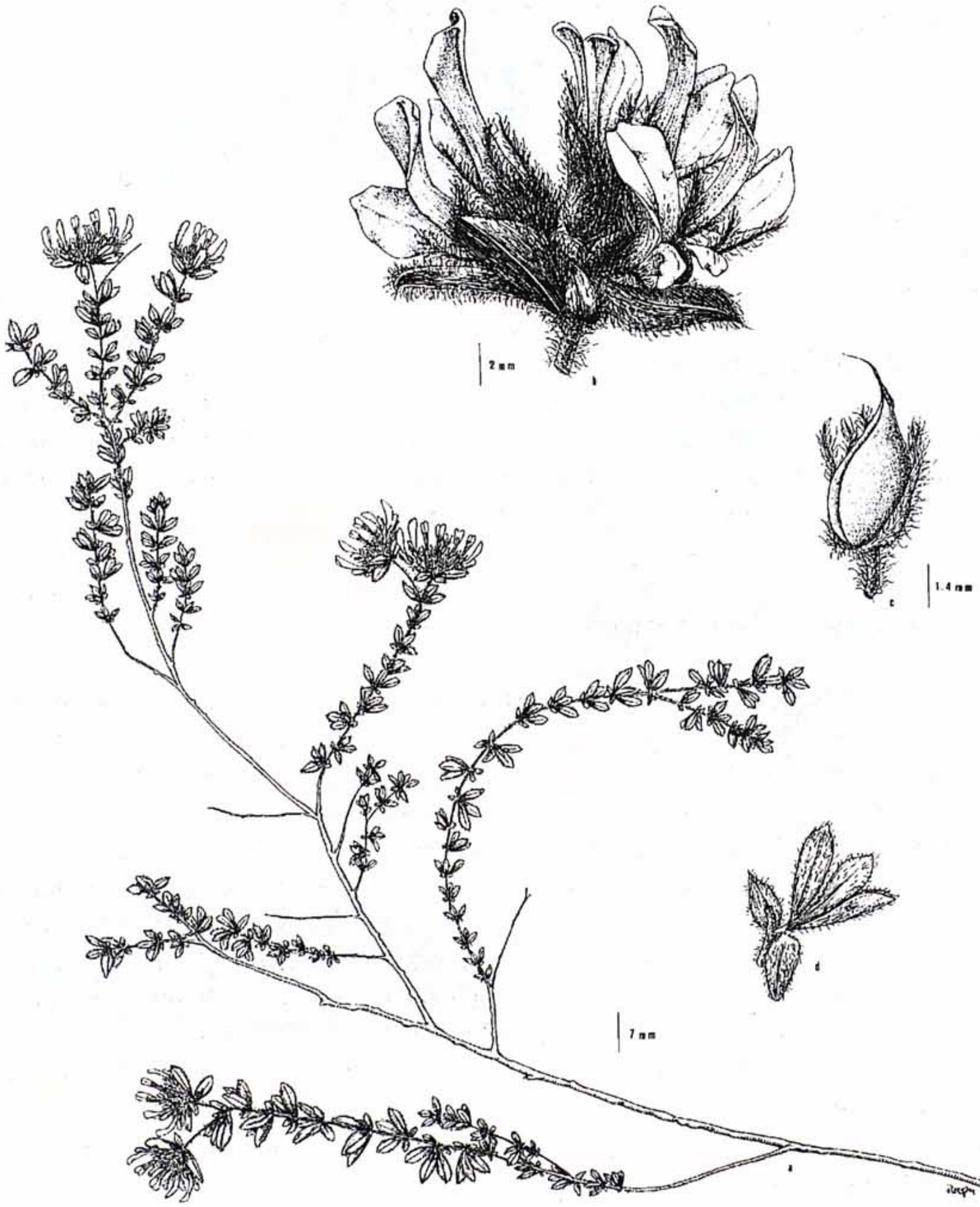


Fig. 3. *Dorycnium hirsutum* var. *postratum:* a, habit; b, inflorescense; c, legume; d, detail of the leaves.

Fig. 4. Habitat of *Dorycnium hirsutum* var. *postratum*.

**Illustrating habitats**

Habitats representations show the composition of the whole or partial plant community, with relevance to structural aspects. Preliminary drawings were prepared from sketches done in the field and photographs. Several field visits were made in order to understand the composition, distribution and density of plants in the field. A typical shape of each group of plants was required, therefore a number of specimens were studied. After being checked by the scientist the drawings were directly transferred to polyester film and then rendered with technical pens.

**A brief discussion about the materials**

In illustrating plant morphology, the work with nibs and blades on a coated surface, allows a high level of detail when drawing delicate and thin structures. Nibs can produce continuos lines of variable thickness, therefore illustration results naturalist and realist (CUTLER, 1987). However , this work is time consuming. When illustrating representations of habitats, the work with technical pens is faster, but as the lines produced by each of these pens has always the same thickness, the representation might result lightly mechanical (WOOD, 1994). This kind of tracing is suitable to the typified representation of landscapes, although it should not lose the fluency. The polyester film does not allow the scratching, but it can dispense the use of a transfer sheet, once it is already transparent, and the preliminary drawing can be directly transferred to the final surface (HODGES, 1988). Interpretation in scientific illustration involves finding the best graphic solution to suggest outlines, texture, tones and details of a certain specimen or group of plants. Different materials and graphic approaches were used according to the level of detaill of the drawings.

Scientific illustration is an important tool to understand plant diversity.

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**References**

BLUNT, W. (1967). *The art of botanical illustration*. Wm. Collins Sons & Co., Ltd., London.

CUTLER, M. (1977). *How to cut drawings on scratchboard*. Watson-Guptill Publications, New york.

HODGES, E. R. S. (ed.) (1988). *The guild handbook of scientific illustration*. Van Nostrand Reinhold Co., New York.

HODGES, E. R. S. (1989). Scientific illustration: a working relationship between the scientist and artist. *Bioscience* **39** (2): 104-111.

WOOD, P. (1994). *Scientific illustration, a guide to biological, zoological and medical rendering techniques, design, printing and display*, ed. 2. Von Nostrand Reinhold Co., New York.

RÍVAS-MARTÍNEZ, S., T. E. DÍAZ & F. FERNÁNDEZ-GONZÁLEZ (1990a). De flora iberica notulae sparsae. *Itinera Geobot.* **3**: 137-8.

——, M. LOUSA, T. E. DÍAZ, F. FERNÁNDEZ-GONZÁLEZ & J. C. COSTA (1990b). La vegetacíon del sur de portugal. *Itínera Geobot.* **3**: 38-41.

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