



Notes on the traditional uses of *Pterospartum tridentatum* (L.) Willk. in Portugal

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Notes on Ethnobotany

Abstract

In Portugal, the flowers, stems and roots of *Pterospartum tridentatum* (L.) Willk [= *Genista tridentata* L.], a species native to the Iberian Peninsula and northwest Africa, have been used in traditional medicine as antioxidant, anti-diabetic and anti-inflammatory. Other historical and contemporary uses include culinary, to add a rustic touch to meat and rice, fuel and firelighter. In the city of Porto, its use as firelighter gave rise to a commercial activity, between the late 19th and mid-20th centuries, in which women played a central role.

Keywords: *Pterospartum tridentatum*, *Genista tridentata*, *carqueja*, anti-inflammatory, diabetes, genistein, firelighter, social history. In Portugal, the flowers, stems and roots of *Pterospartum tridentatum* (L.) Willk [= *Genista tridentata* L.], a species native to the Iberian Peninsula and northwest Africa, have been used in traditional medicine as antioxidant, anti-diabetic and anti-inflammatory. Other historical and contemporary uses include culinary, to add a rustic touch to meat and rice, fuel and firelighter. In the city of Porto, its use as firelighter gave rise to a commercial activity, between the late 19th and mid-20th centuries, in which women played a central role.

Keywords: *Pterospartum tridentatum*, *Genista tridentata*, *carqueja*, anti-inflammatory, diabetes, genistein, firelighter, social history.

Pterospartum tridentatum (L.) Willk. in Portugal

In Portugal, the species *Pterospartum tridentatum* (L.) Willk. [= *Genista tridentata* L.] is widespread in the north and coastal areas (Figure 1) and has been used for many traditional activities.

The genus *Pterospartum* (Spach) K.Koch is monotypic, with only one species and three recognized subspecies distributed in the Iberian Peninsula and northwest Africa, particularly Morocco (Talavera 1999):

Pterospartum tridentatum (L.) Willk. *tridentatum* (Figure 2, Figure 3)

Pterospartum tridentatum (L.) Willk. *cantabricum* (Spach) Talavera & P.E.Gibbs (Figure 4)

Pterospartum tridentatum (L.) Willk. *lasianthum* (Spach) Talavera & P.E.Gibbs (Figure 5)

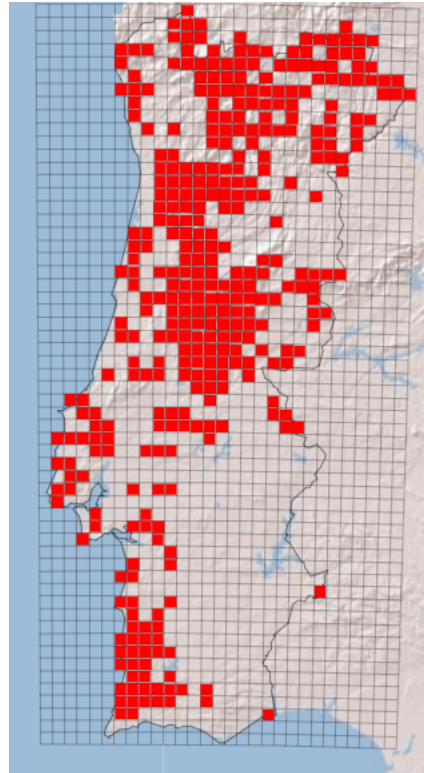


Figure 1. Distribution of *Pterospartum tridentatum* (L.) Willk. in Portugal (Flora-on)



Figure 2. Flowering branch of *Pterospartum tridentatum* (L.) Willk. *tridentatum*. Photo by Miguel Porto (Flora-on)



Figure 3. Stems of *Pterospartum tridentatum* (L.) Willk. *tridentatum*. Photo by João Domingues Almeida (Flora-on)



Figure 4. Flowering branch of *Pterospartum tridentatum* (L.) Willk. *cantabricum* (Spach) Talavera & P.E.Gibbs. Photo by João Domingues Almeida (Flora-on)

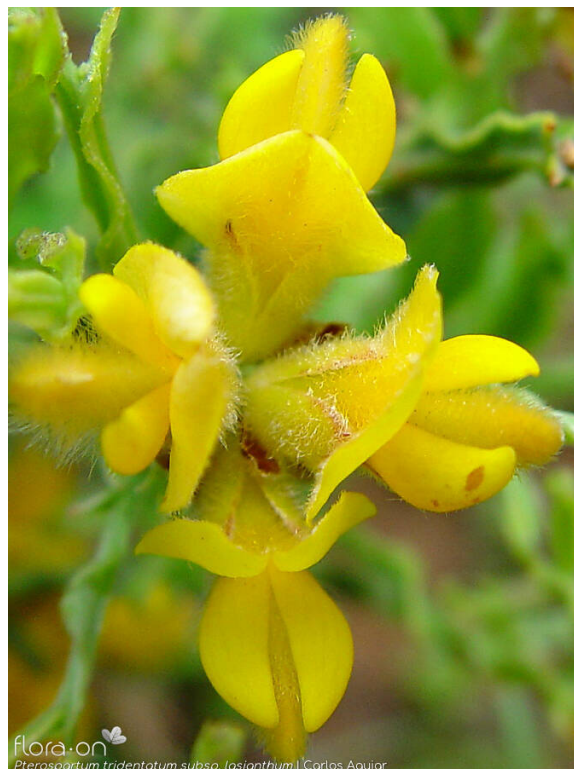


Figure 5. Hairy flowers of *Pterospartum tridentatum* (L.) Willk. *lasianthum* (Spach) Talavera & P.E.Gibbs. Photo by Carlos Aguiar (Flora-on)

The etymology of the genus *Pterospartum* has its roots in the Greek *pterón* = feather, bird wing; and in the Greek *spárton* (Latin *spartum*) = the classic name for several plants used in rope making, such as broom (*Spartium junceum* L.) and esparto grass (*Stipa tenacissima* L.). This name alludes to the winged stems and the similarity of this plant (mainly the flowers) to the broom plants (genus *Spartium* L.). The word *tridentatum* comes from the Latin *tri-* = three; Latin *dens* (*dentis*) = tooth; Latin *-atum* = adjective suffix indicating possession or similarity. The Latin word *tridentatum* means ‘with three teeth’ and refers to the sessile leaf and its two leathery stipules with spiny tips. The epithet *cantabricum* refers to the location of the habitat, in the Cantabrian Mountains. The epithet *lasianthum* derived from the Greek *lasi-* (*lásios*) = woolly, velvety, with short and thick hair, and the Greek *ánthos* = flower; so *lasianthum* alludes to the dorsal velvety standard (petal).

The common Portuguese name is *carqueja*, and the plant organs used in traditional medicine are flowers, leaves, stems and, less commonly, roots. It can be administered orally or externally (baths and compresses), in the form of aqueous extracts (infusions, decoctions and syrups).

Tradition states that the flowers are at their prime on the eve of Saint John's Day (June 24th), when they are harvested, dried, and stored for future use. If taken as an infusion, it should be sweetened with honey due to its bitter taste (Carvalho & Ramos 2012). It is used to treat liver and gallbladder diseases, as well as diabetes, with two cups per day for a short time (Neves *et al.* 2009, Carvalho & Ramos 2012). For skin problems such as acne, it is recommended to make a decoction of the roots and take one cup in the morning and one in the evening, for nine consecutive days, with the concomitant topical application of linen cloths soaked in the hot aqueous extract. For respiratory diseases, such as cough, flu and colds, it is recommended to take the flower extract in the form of a syrup (Carvalho 2005). Besides these applications, this species can also be used in kidney lithiasis, gastritis, rheumatism, anxiety, high levels of cholesterol, and hypertension (Feijão 1952, Morra 1978, Neves *et al.* 2009, Carvalho & Ramos 2012).

The plant extract composition varies accordingly to the extraction method, possibly due to the solubility of its compounds (Laranjeira *et al.* 2023). Studies of its chemical composition and biological activities, carried out with different plant parts, confirmed its antioxidant, anti-diabetic and anti-inflammatory activities. These effects may be related to its high content of flavonoids, mainly genistein, isoquercetin and rutin, as these compounds can protect cells from oxidative stress by inhibiting

pro-inflammatory mediators (Pinto *et al.* 2020, Laranjeira *et al.* 2023). This antioxidant protection can also prevent or reduce the endothelial damage associated with diabetes (Vitor *et al.* 2004).

Other data also revealed a significant synergistic effect between the bioactive compounds and the increased antioxidant activity, and so the high antioxidant effect of the extracts is probably due to a synergistic interaction between the plant's phytochemical components (Laranjeira *et al.* 2023). Available toxicological data suggest that the intake of stem and flower extracts in higher concentrations can cause liver, kidney and spleen toxicity, so its use for more than ten days is not recommended (Silva 2009), just as indicated in traditional medicine. Pregnant and breastfeeding women as well as children under the age of twelve should not consume it.

In addition to these medicinal uses, the stems are sometimes used in cooking to add a gamey flavor to dishes that are traditionally prepared with game but lose much of their organoleptic value when prepared with poultry meat such as rabbit, partridge, pheasant, and quail from the poultry farms; the stems can also be used to prepare a famous rice dish (Figure 6).



Figure 6. *Carqueja* rice with meat. Photo by Restaurante Santos (Coimbra).

In rural areas, the stems are used to make the bed for farm animals (cattle, sheep and goats) and produce a higher quality manure; they are also used to singe the pig's hairs during the traditional slaughter of these animals. In the past, its main use was as fuel and firelighter, both in rural and in urban areas. This latter use was the base of a commercial activity that lasted until the mid-20th century (Figure 7, Figure 8).



Figure 7. Load of *carqueja* (Chaves, North of Portugal). Postcard, early 20th century. Private Collection.



Figure 8. Load of *carqueja* (Chaves, North of Portugal). Postcard, early 20th century. Private Collection.

In Porto, Portugal's second largest city, between the late 19th and the mid-20th centuries, small bundles of *carqueja* were sold as firelighters for use in bakeries and private homes. The plants were harvested in the mountains upstream Porto and transported to the city by boat (Figure 9).



Figure 9. Ox cart loaded with *carqueja* to be transported by boat to the city of Porto. Postcard, early 20th century. Private Collection.

The bales of *carqueja*, weighing between 40 kg and 60 kg, were dumped on the banks of the Douro River, where women of low socioeconomic status carried them on their backs along the *Calçada das Fontainhas* (now *Calçada das Carquejeiras*), a very steep road with a gradient of 21% and a length of approximately 200 meters (Figures 10 to 13). These women, sometimes called ‘human hedgehogs’, roamed the streets of Porto barefoot and often accompanied by their children, selling small quantities of their cargo to earn a low income that always kept them on poverty. Although this human bondage was denounced throughout the 20th century, and even served as an art motif, such as in the painting *Carquejeira* (Figure 14) by Júlio Pomar (1926-2018), a famous Portuguese painter, it only ended when electricity replaced wood and coal stoves. The last *carquejeira* [traditional name for a woman who sold *carqueja*] was Palmira de Sousa, who died in 2014 at the age of 102. Six years later, on March 1st, 2020, Porto paid tribute to them by erecting a statue (Figure 15), so that their sacrifice and memory would not be forgotten (Santos 2022).

Declarations

List of abbreviations: Not applicable.

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Figure 10. *Calçada das Fontainhas* (Porto). Postcard, early 20th century. Private Collection.



Figure 11. Carrying bales of *carqueja* along the *Calçada das Fontainhas*, Porto (early 20th century).
Photo by Arquivo Distrital do Porto, Reference PT/ADPRT/ASS/LPPS/DIR/013-026/0677



Figure 12. Woman carrying bales of *carqueja* along the *Calçada das Fontainhas*, Porto (early 20th century).
Photo by Arquivo Distrital do Porto, Reference PT/ADPRT/ASS/LPPS/DIR/013-026/0677



Figure 13. Woman carrying bales of *carqueja* along the *Calçada das Fontainhas*, Porto (early 20th century).
Photo by Arquivo Distrital do Porto, Reference PT/ADPRT/ASS/LPPS/DIR/013-026/0677

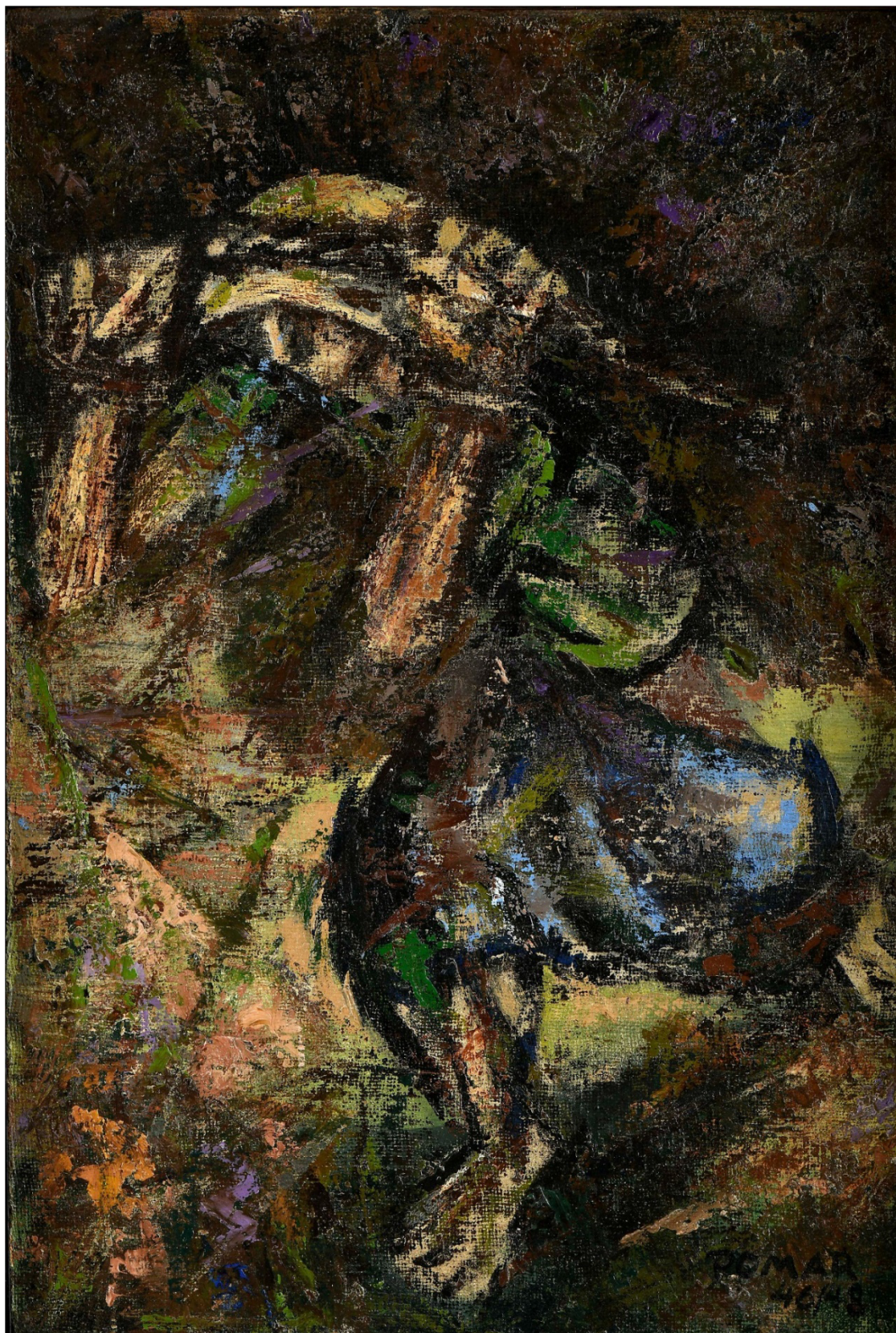


Figure 14. *Carquejeira* (1946-1948) by Júlio Pomar (1926-2018), oil on compressed wood. Private Collection. Photo by Cabral Moncada auction house.



Figure 15. Statue erected in 2020, to honor the *carquejeiras* (women who carried and sold *carqueja*) (Porto). Photo by Margó Szendrei.

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