



Archaeological evidence on the use of vetchlings (*Lathyrus* spp) in ancient Europe

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Most of the traditional Eurasian grain legumes, such as chickpea (*Cicer arietinum* L.), lentil (*Lens culinaris* Medik.), pea (*Pisum sativum* L.) and common vetch (*Vicia sativa* L.) originate primarily from the Near Eastern centre of diversity. However, many of the economic species of the genus of vetchlings (*Lathyrus* L.), such as red pea (*Lathyrus cicera* L.), Cyprus vetch (*Lathyrus ochrus* L.), sweet pea (*Lathyrus odoratus* L.) or grass pea (*Lathyrus sativus* L.), evolved in the Mediterranean centre of diversity (Zeven and Zhukovsky 1975).

Grain legumes, including vetchlings, had been known to humans before they became cultivated crops. The earliest evidence of their use in human consumption are the fossilized microremains of chickpea, lentil, pea and vetches (*Vicia* spp.) in calculus of the Neanderthal skeletons from Shanidar Cave in Iraq about 46 000 years old (Henry *et al.* 2011), along with few other cereals. Together with pea and vetches, vetchlings were present in the everyday diet of the hunter-gatherers at the end of the last Ice Age in Europe, as witnessed by the remains from the site of Santa Maira, Spain, from 12 000–9 000 BP (Aura *et al.* 2005).

The remains of domesticated grain legumes often occur at high frequencies during the 10th and 9th millennia (Willcox *et al.* 2008) may contribute to the possibility that the domestication of grain legumes could predate cereals (Kislev and Bar-Yosef 1988). However, little is known about the early stages of pulse domestication and it is hard to determine there is very little evidence of how, when and where they were domesticated, mostly due to a fact that all those changes, being mostly morphological, do not survive to the present day. Among the earliest findings of cultivated grain legumes is the site of Tell El-Kerkh, Syria, from 10th millennium BP, with the seeds of lentil, bitter vetch (*Vicia ervilia* (L.) Willd.), chickpea, grass pea (*Lathyrus sativus* L.), faba bean (*Vicia faba* L.) and pea (Tanno and Willcox 2006).

In all plant species, the process of domestication led to certain morphological changes that, in many aspects, strongly resemble the methods of selection used in contemporary plant breeding programmes. In grain legumes, the major criteria to determine the domestication are non-dehiscent pods, larger seed size and smooth seed testa. In the case of pea, a very close relative of vetchlings, the gene *Dpo*, controlling pod dehiscence (Weeden *et al.* 2002), underwent modifications during the domestication and thus became responsible for the development of non-dehiscent genotypes. Larger seed size in cultivated forms in comparison to that in wild ones is not typical only for grain legumes, but is often very hard to interpret. A smooth testa, due to the domestication, is the most reliable characteristic in telling wild from cultivated forms. Apart from these three major, there are several other indicators of the pea, vetchlings and other ancient Eurasian grain legumes domestication, such as absent seed dormancy, dwarf growing habit, less prominent basal branching, neutral photoperiodical reaction and improved grain quality (Weeden 2007).

It is quite certain that vetchlings were one of the most ancient crops that entered Europe, after it had become more suitable place for living again, following the end of the last Ice Age. Thus grass pea, red pea and other vetchlings, along with pea, lentil and several other grain legumes and cereals, have become definitely associated with the start of the 'agricultural revolution' in the Old World (Ljuština and Mikić 2010). Vetchlings entered Europe in its southwest, especially in the Iberian Peninsula where vetchlings seem to be most abundant of all grain legumes (Mikić *et al.* 2009), and southeast regions, roughly progressing into its interior via Danube. Its distribution was a rapid one, since the available evidence reveals its presence in mutually remote places at similar periods.

The following brief selection of archaeological findings offers nice examples that confirm the extreme importance vetchlings had in the primeval European agriculture.

5790-5630 BC, Kovačevo, southeast Bulgaria. The final early Neolithic site in southwest Bulgaria, with lentil,

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pea and bitter vetch found along with grass pea, red pea and several cereal species (Marinova and Popova 2008).

5600–5100 BC, Sammardenchia, northern Italy. In addition to cereals, there is an abundance and diversity of pulses, including pea, lentil, vetches, bitter vetch and grass pea and red pea (Rottoli and Castiglioni 2009).

4500–3500 BC, Le Chenet des Pierres in Bozel, Savoie, France. The analyses of archaeobotanical assemblages recovered in recent excavations in the northern French Alps. Vetchlings were the only grain legumes together with pea and to a much lesser extent in comparison to cereals (Martin *et al.* 2008).

3700 BC, Hoëvarica, Slovenia. The first records of grass pea, together with common vetch (*Vicia sativa* L.), in the circumalpine settlements of the fourth millennium B.C. Other cultivated grain legumes included pea, although considerably less numerous in comparison to cereals.

2500–2000 BCE, Early Bronze Age Titris, Höyük, southeast Anatolia, Turkey. Along with cereals and grapes, as well as with bitter vetch (*Vicia ervilia* (L.) Willd.), vetchlings were one of the major crops (Hald 2010).

1200–950 BC, Late Bronze Age lagoon sites near Montpellier, southern France. Both grass pea and red pea were present along with lentil, bitter vetch and faba bean (*Vicia faba* L.) and cereals (Bouby *et al.* 1999).

1100–1000, Stagno near Livorno, Tuscany, Italy. Vetchlings, together with chickpea, lentil, pea and vetches, were present in the everyday use at this Final Bronze Age–Iron Age site (Bellini *et al.* 2008).

As one of the most ancient crops in the world, vetchlings played an important role in the introduction of agriculture in post-glacial Europe, sometimes representing the main pulse in the diets of local communities across the continent. The future research on this subject certainly must make a more detailed map of its paths over Europe and, especially, its long-term and essentially important ties with the pea domestication and distribution in Asia Minor, Near East and North Africa.

SUMMARY

Vetchlings (*Lathyrus* spp) were a part of the everyday diet of the European hunter-gatherers at the end of the last Ice Age. The major criteria to determine the domestication in vetchlings are non-dehiscent pods, larger seed size and smooth seed testa. Vetchlings seeds were found among the earliest findings of cultivated crops at the site of Tell El-Kerkh, Syria, from 10th millennium BP. Along with cereals, pea and lentil, vetchlings have become definitely associated with the start of the ‘agricultural revolution’ in the Old World. Vetchlings entered Europe in its southern regions and progressed into its interior via Danube. Its distribution was rapid, since the available evidence reveals its presence in remote places at similar periods.

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