

The Development and Spread of Neolithic Crop Agriculture in the Western Balkans

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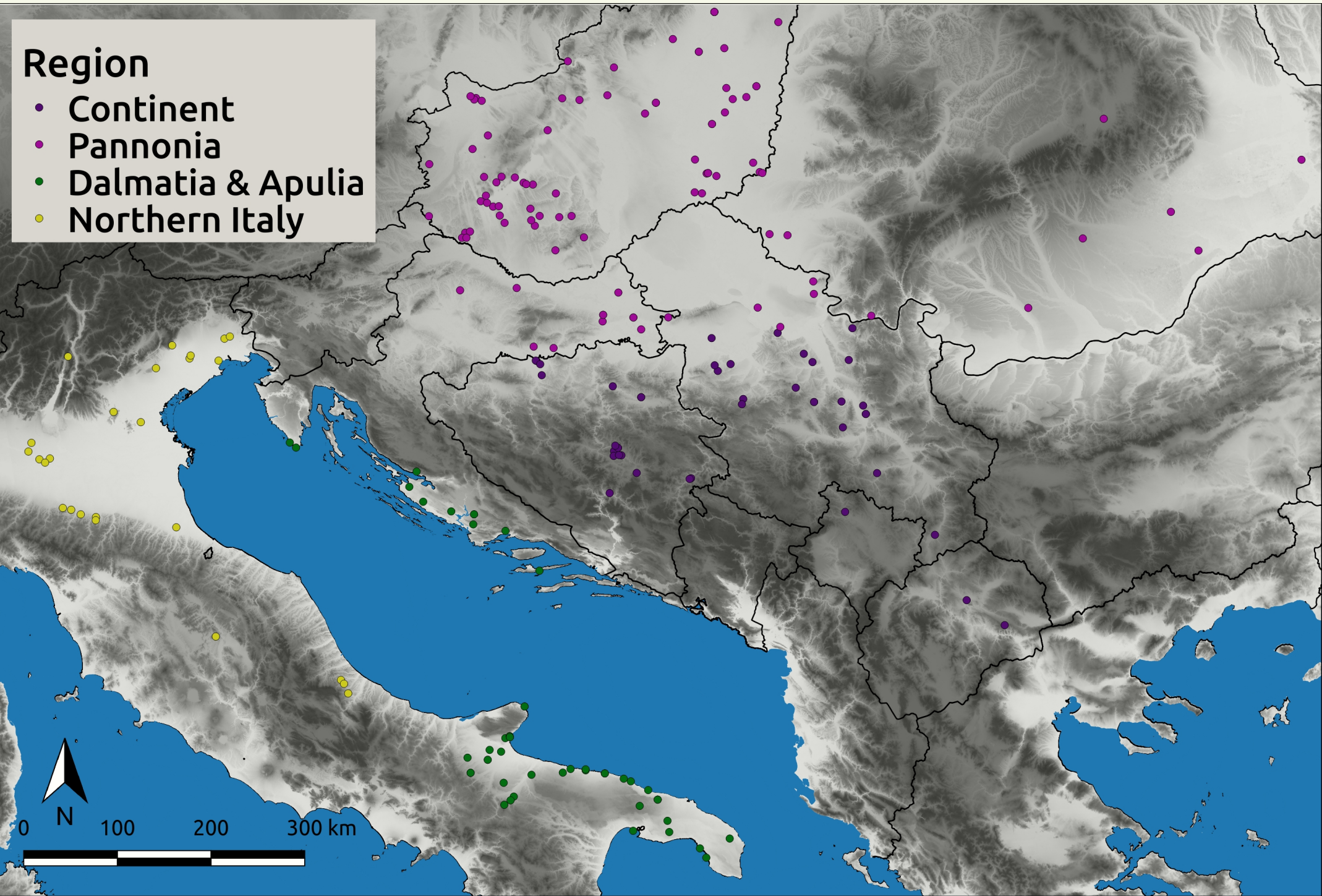
Supervised by Dr. M.Vander Linden, Prof. D.Fuller and Dr. S.Colledge



The Project - an Introduction

The research presented here is part of a five year ERC funded project entitled Transmission of Innovations: comparison and modelling of early farming and associated technologies in Europe (EUROFARM), directed by Dr M. Vander Linden. The aim of EUROFARM is to explore the first inland and coastal spreads of farming in the Western Balkans (Croatia, Bosnia and Herzegovina, Montenegro and Serbia) through four main technological innovations: farming practices, landscape use, pottery and lithics.

This poster presents the preliminary results of an exhaustive survey of archaeobotanical data from across the Western Balkans and its surrounding countries, covering the extent of the Impress Ware phenomenon along the Eastern and Western Adriatic coasts, and that of the Starčevo-Körös-Criş across the Former Yugoslavia and into Southern Hungary and Romania.



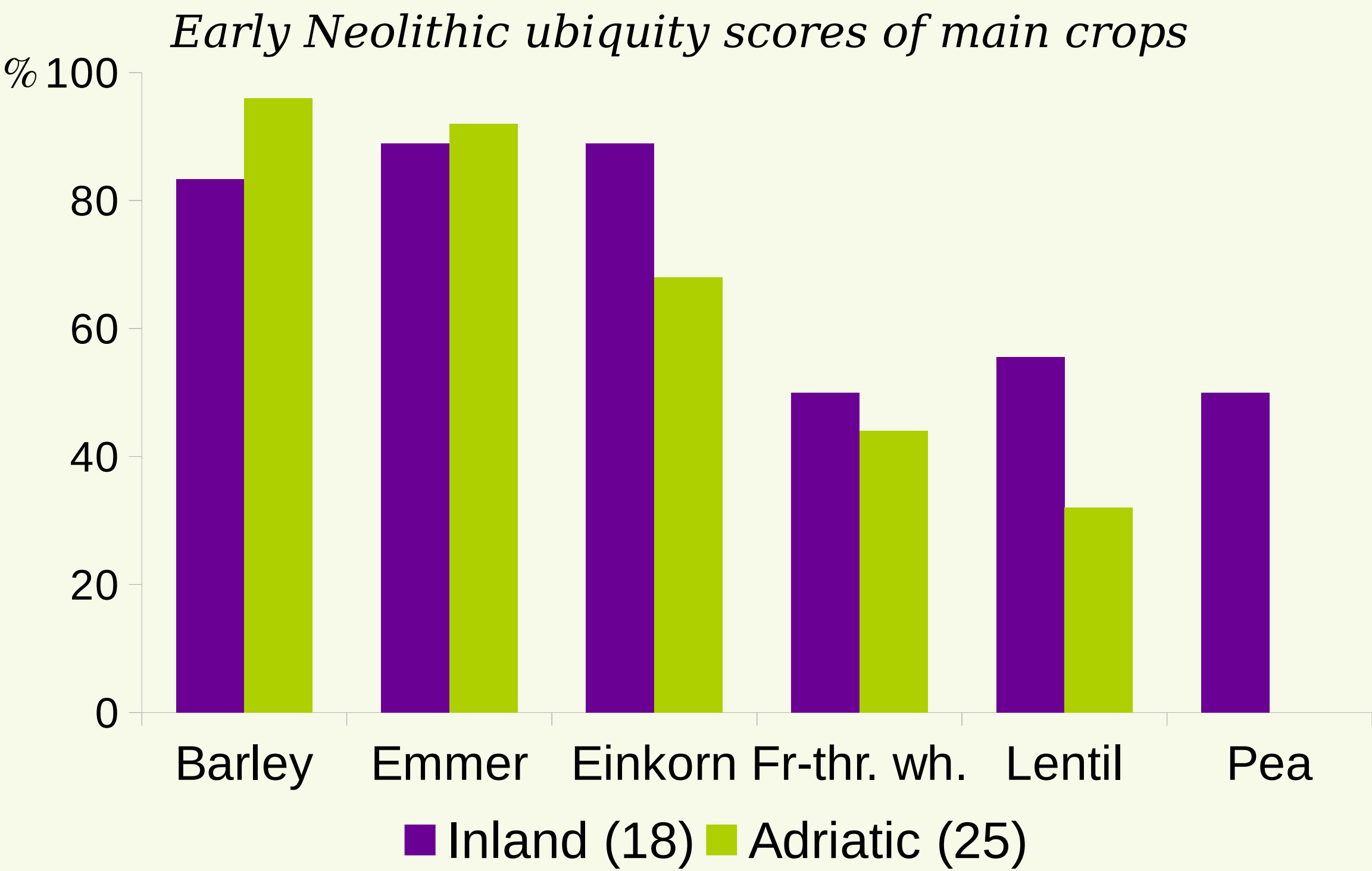
Neolithic sites with archaeobotanical data from impressions and charred

Data and Analysis

Records of grains, seeds, nuts and fruits recovered charred and as impressions were obtained from 208 sites. Two issues arose:

- 1 - archaeobotanical records rarely include details on the recovery and recording of data, which varies between countries and through time
- 2 - the two forms of preservation provide complimentary but not congruent information¹, and are not easily integrated. Up to a third of the main crops only occur charred

Records from impressions were removed and the remaining data was reduced to presence/absence of taxa. This study therefore includes carbonised crops from 126 sites (134 phases). 32% of records are from the Early Neolithic (c.6000-5400 BC), and 68% from the Mid/Late Neolithic (c.5400-4500 BC).



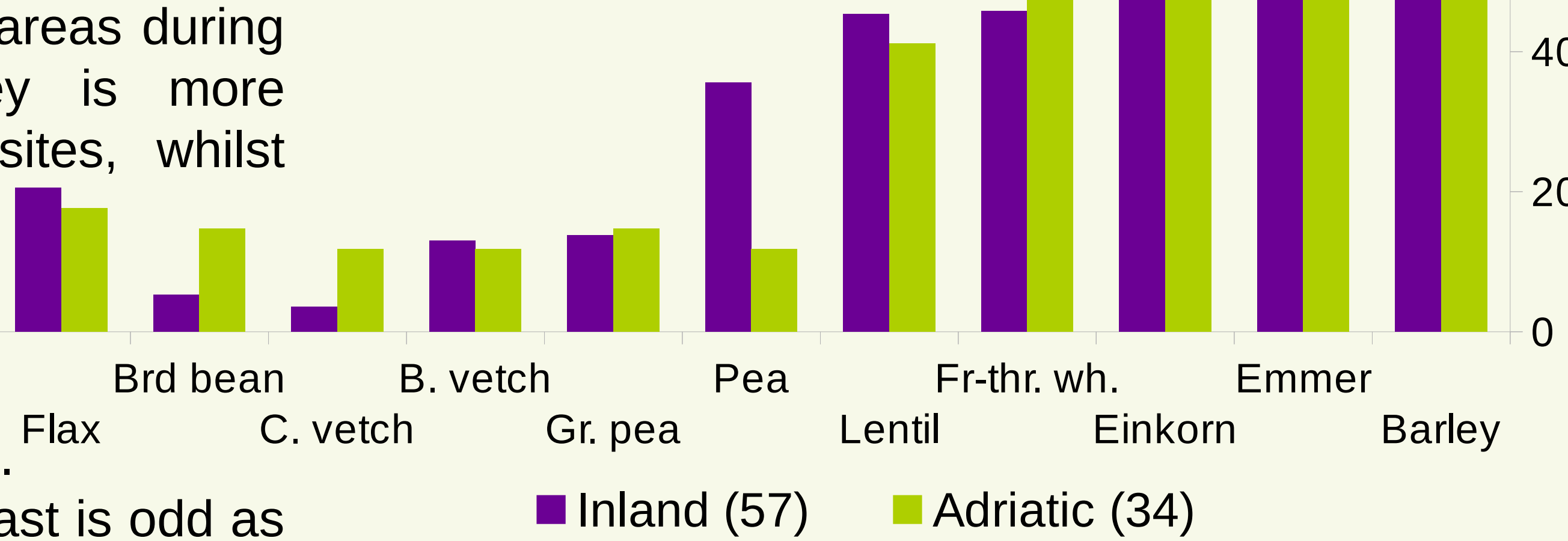
The binary data for 11 crops occurring in >5% of sites was organised chronologically (pre & post 5600 cal BC) and geographically (Adriatic vs Inland, with further divisions therein), and ubiquity scores of crops by site are presented here. The groups were tested using the Cochran Q test², which confirmed a level of statistical coherence (p -value <0.05), i.e. that the associations of crops within groups are not random. The difference in diversity between groups was also evaluated using the Shannon-Wiener diversity index (H)³.

Results

The Early Neolithic

The main crops reached all areas during the Early Neolithic. Barley is more ubiquitous across coastal sites, whilst emmer and einkorn are slightly more common inland, not unlike the preference for hulled wheats during the Early LBK⁴.

The lack of pea along the coast is odd as it is found in contemporary Spain⁵. Broad bean and grass pea are initially restricted to the coast, perhaps reflecting an early maritime spread.

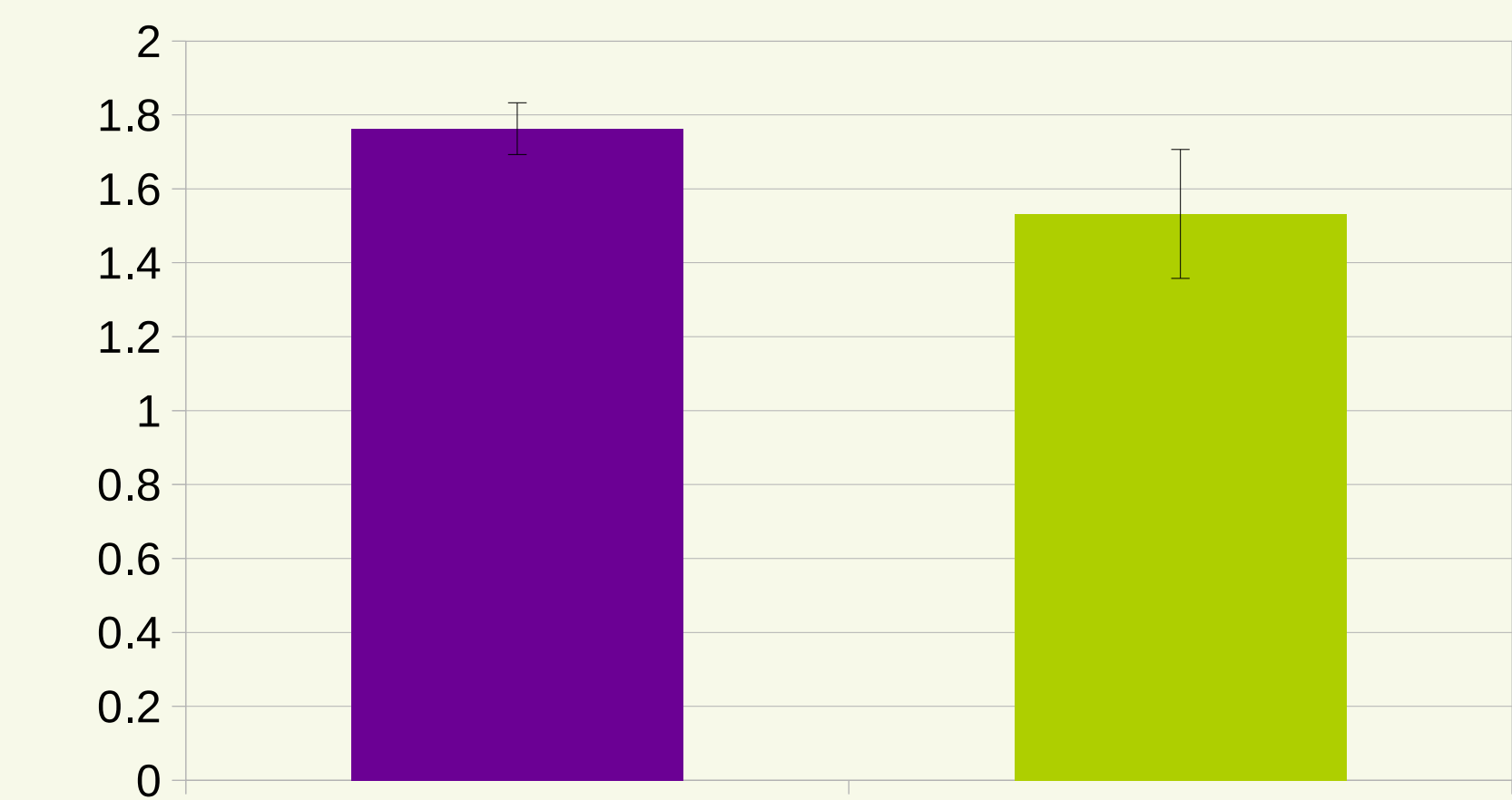


Mid/Late Neolithic

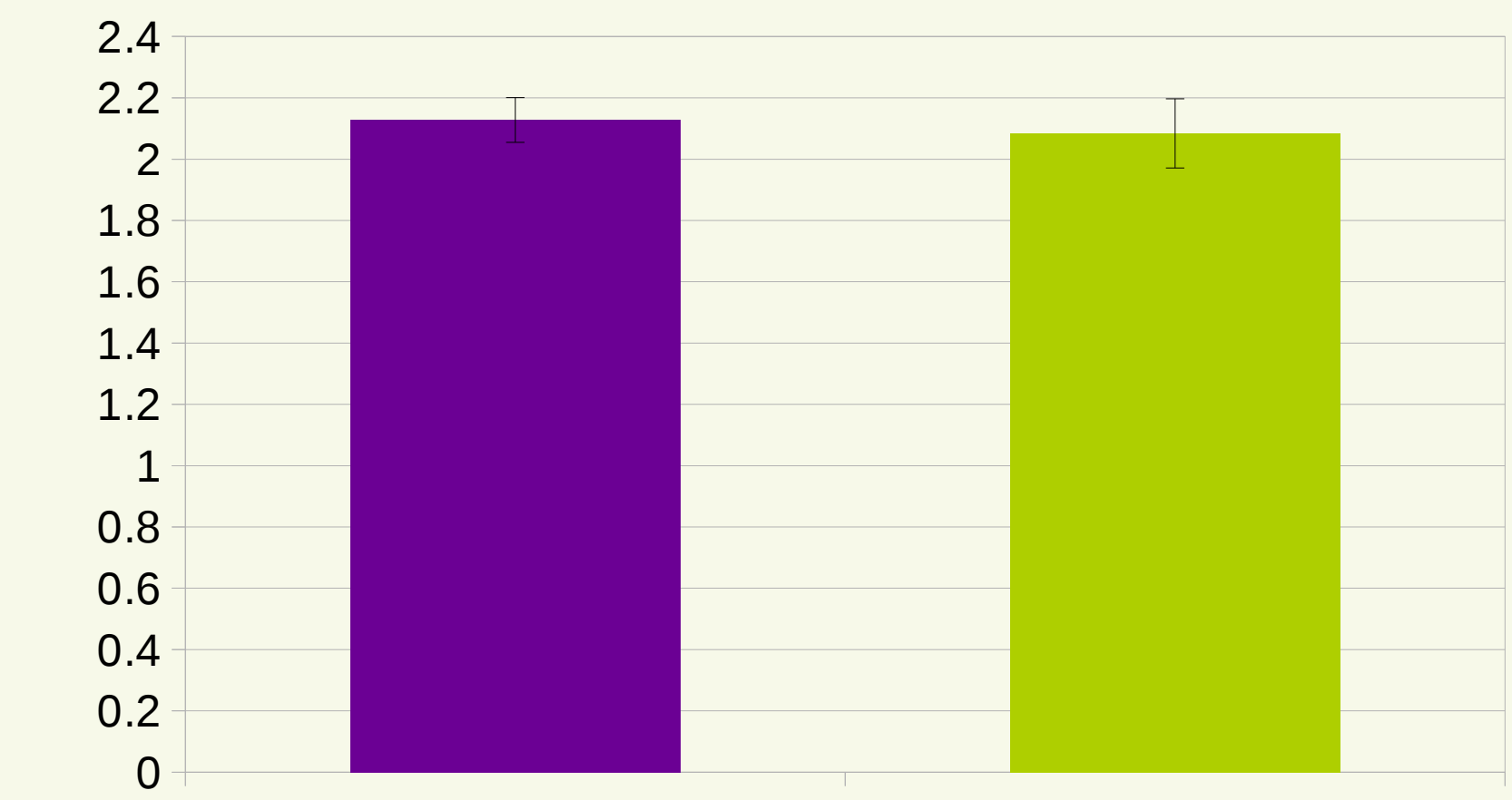
The range of crops greatly diversifies. Though proportions of particular crops vary between the inland and coastal groups, the same package is used throughout. Common vetch is found for the first time, mostly in Northern Italy. The sharp rise in flax tentatively suggests renewed efforts towards its cultivation.

		E. Neo c.6000-5400 BC		Later Neo to c.4500 BC	
		Inland	Coastal	Inland	Coastal
<i>Hordeum vulgare</i> L.	Barley	X	X	X	X
<i>Triticum dicoccum</i> Schübl.	Emmer	X	X	X	X
<i>Triticum monococcum</i> L.	Einkorn	X	X	X	X
<i>T. aestivum/durum</i>	Free-thr. wheat	X	X	X	X
<i>Lens culinaris</i> Medik.	Lentil	X	X	X	X
<i>Pisum sativum</i> L.	Pea	X		X	X
<i>Lathyrus sativus</i> L.	Grass pea		X	X	X
<i>Vicia ervilia</i> (L.) Willd.	Blitter vetch	X	X	X	X
<i>Vicia sativa</i> L.	Common vetch			X	X
<i>Vicia faba</i> L.	Broad bean		X	X	X
<i>Linum usitatissimum</i> L.	Flax	X	X	X	X
Other contentious / poorly understood crops					
<i>Panicum miliaceum</i> L.	Millet	X		X	X
Striate emmeroid	'New' gl. wheat	X		X	X
<i>T. spelta</i> L.	Spelt	X	X	X	X

Crops present in the Neolithic of the Western Balkans

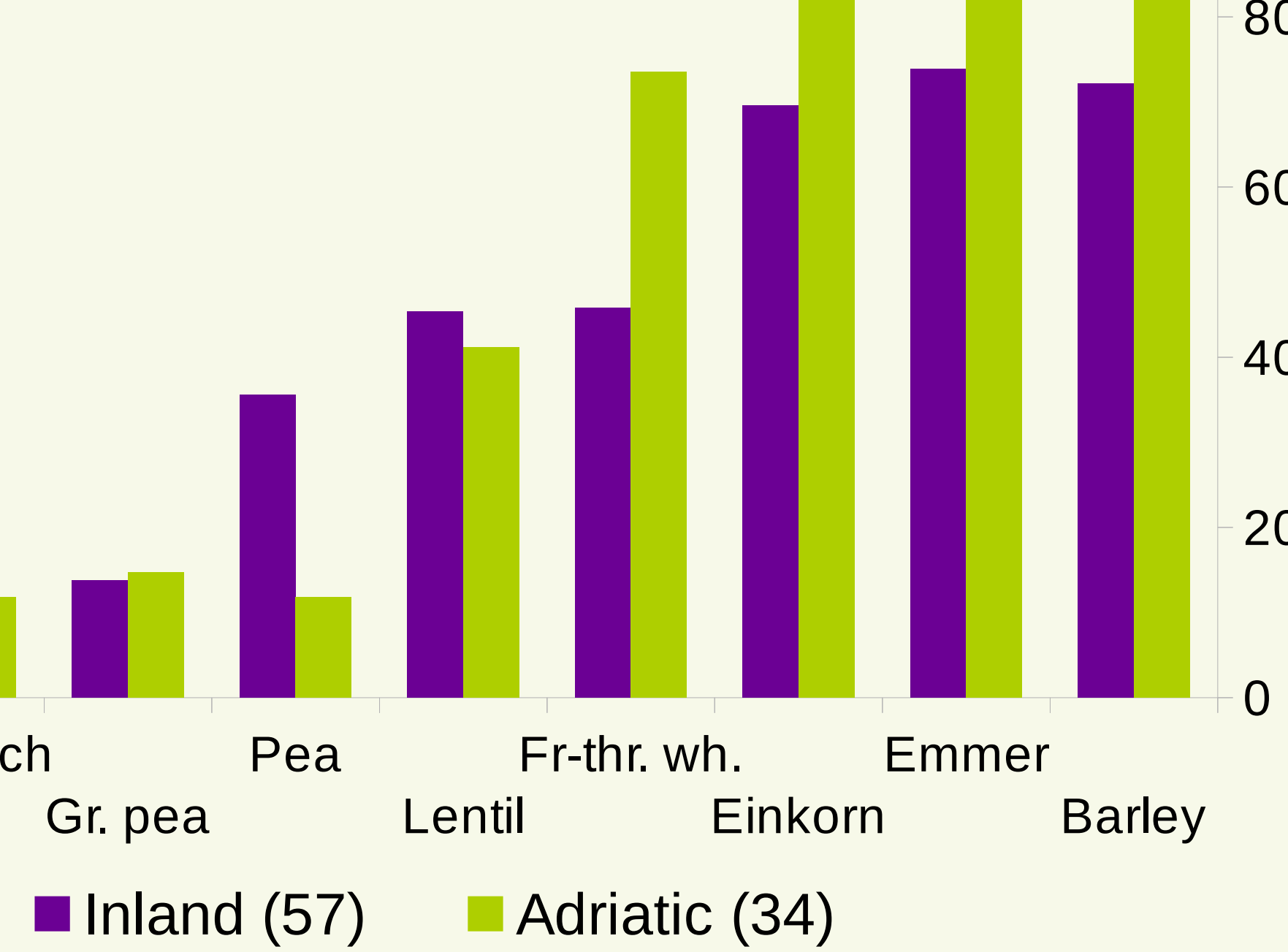


H values for E. Neo inland and coastal crop packages. The differences in diversity do not overlap and are statistically significant



H values for M/Late Neo inland and coastal crop packages. The differences overlap and are not statistically significant

Mid/Late Neolithic ubiquity scores of main crops



Preliminary Conclusions

The inland and coastal crop packages are statistically coherent and warrant further investigation. Their initial differences in diversity may relate to the first spreads of crop agriculture, along the two main routes of the Adriatic and Danube catchment areas^{6,7}. As the Neolithic developed both areas saw an intensification in the range of crops, and a possible diversification in agricultural regimes. This study demonstrates that the crop package was not strictly reduced, and that its development is key to understanding early crop agriculture in Western Europe^{8,9,10,11}.

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