

Cicer arietinum (chick pea) in the Neolithic and Chalcolithic of Bulgaria: implications for cultural contacts with the neighbouring regions?

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Abstract *Cicer arietinum* (chick pea), is one of the elements of the Neolithic founder crop assemblage. It was spread from the Near East to southeastern Europe during the Neolithic, but until recently it was not thought to have reached further north than the territory of modern Greece. However, the latest finds from the Bulgarian Neolithic (6000–5450 cal B.C.) and late Chalcolithic (4450–3900 cal B.C.) show a distribution of this crop outside the Mediterranean region, to areas with a more temperate climate. It seems, however, that chick pea did not appear in the archaeobotanical record during the first stages of the Bulgarian Neolithic period, but only in its second half, or even later. So far, on the Thracian plain only at one site which from a cultural point of view is strongly related to southwest Bulgaria, have finds of chick pea appeared. These are considered to belong to the second and last third of the early Neolithic and originate from structures dated from 5920–5730 to 5670–5450 cal B.C. During the Chalcolithic of Bulgaria (around 4500 cal B.C.), *Cicer* appears on the Thracian plain at Yunatzite and also to the

north of the Balkan mountains at Hotnitsa. The spread of *C. arietinum* in the prehistoric period in southeast Europe provides insights into some of the patterns of contacts and interactions between today's Bulgaria with Thessaly and Anatolia.

Keywords Pulses · Neolithic · SE Europe · Early farming

Introduction

The chick pea is one of the humanity's oldest crops, which was taken into cultivation as early as about 8500 cal B.C. (Tanno and Willcox 2006). Today it is an important legume cultivated and consumed as a source of vegetable protein in many countries. According to the Food and Agriculture Organization statistics (FAO 2005–2006), in 2004 the crop was grown in 44 countries across five continents, making it the third most important pulse crop (18.1% of world total). Numerous information on the Neolithic distribution of the chick pea from the Near East and Turkey exists (Fairbairn et al. 2002; Hopf 1983; Pasternak 1998; Van Zeist and De Roller 1992, 1995; Tanno and Willcox 2006); in the last paper an overview of the Neolithic Near Eastern chick pea finds is given. Some records from Greece are also available (Kroll 1979, 1981), but no information on its spread further northwest into the Balkans has been presented until now (Colledge et al. 2005; Valamoti and Kostakis 2007; Zohary and Hopf 2000). The recent archaeobotanical evidence from the Bulgarian Neolithic and Chalcolithic gives some additional information on the spread *Cicer arietinum* into the Balkans. The aim of this paper is to describe and analyse these recent finds, considering their meaning in a local and regional context.

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Study area and archaeological settings

Bulgaria is situated in southeastern Europe, in a zone with a sub-continental and transitional to Mediterranean climate (Fig. 1). The mean annual temperature is between 10 and 13°C and the mean annual precipitation varies between 500 and 700 mm. The vegetation in the lowlands and up to 700 m a.s.l. consists of xero-thermophyllous oak woods dominated by *Quercus frainetto* (Balkan, Hungarian oak) and *Q. cerris* (Turkey oak) (Kopravlev 2002).

The chronological frameworks of the sites mentioned in this paper is given in Fig. 2. This was prepared using the syntheses of the radiocarbon dating for Bulgaria, Greece and Anatolia given by Görsdorf and Bojadzhiev (1996), Boyadzhiev (2006), Reingruber and Tissen (2005), Thissen (2007) and chronological correlations given in Perniceva (1995) and Lichardus-Itten et al. (2002).

The Bulgarian Neolithic can be roughly subdivided into two early Neolithic phases (ca. 6000–5450 cal B.C.), for the different regions a still-debated middle Neolithic (5450–5300 cal B.C.) and a late Neolithic phase (lasting until 4900 cal B.C.; Figs. 2, 3). It is followed by the Chalcolithic or Copper Age, a term used mainly in the archaeology of southeast Europe and the Near East, for Bulgaria corresponding to the period approximately 4900–3800 cal B.C.; it can be subdivided into an early and a late phase, the latter starting around 4450 cal B.C.; Figs. 2 and 3. The Chalcolithic is the period in which copper was used, as well as stone tools. This term is used by scholars of the prehistory of Bulgaria and Anatolia and it roughly corresponds to the late Neolithic in Greece (Fig. 2). During the Neolithic und Chalcolithic

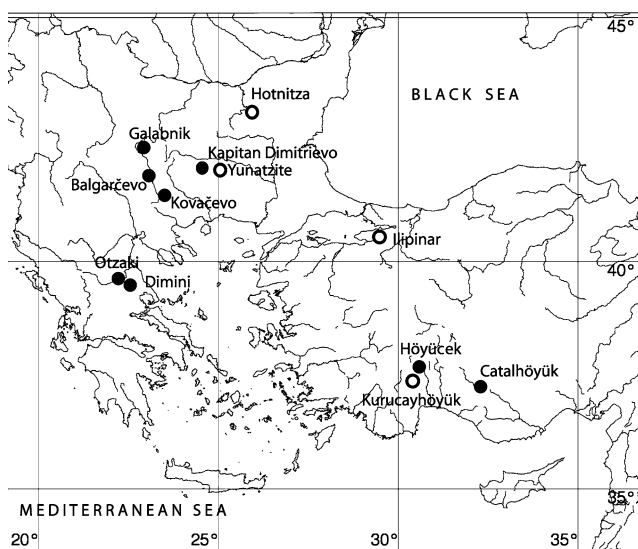


Fig. 1 Location of the studied and other important for the study sites. Filled circles Neolithic, empty circles Chalcolithic

periods various regional cultures and cultural groups developed in Bulgaria, which however are not discussed in detail here.

The sites Kovačevo and Bâlgarčevo belong to the so-called flat prehistoric settlements, a type widespread in southwestern Bulgaria (Perniceva 2002).

The site Kovačevo is situated in southwestern Bulgaria, near the border with Greece, lying east of the Struma (Strymon) valley, in the southwestern foothills of the Pirin mountains (Fig. 1). Three main periods of occupation of the Kovačevo site have been defined thus: Kovačevo I—early Neolithic, Kovačevo II—middle Neolithic and Kovačevo III—early Bronze Age (Lichardus-Itten et al. 2002). Kovačevo I represents the earliest Neolithic in the territory of modern Bulgaria. For the early Neolithic, four occupation phases (Ia, Ib, Ic, Id) have been established (Lichardus-Itten et al. 2002). The archaeological material of the first two phases shows connections with those of the area of northern Greece (Giannitsa, Nea Nikomedeia) and Macedonia (the former Yugoslavian Republic) (Anzabegovo, Velusina) (Perniceva 1995; Lichardus-Itten et al. 2002). The last early Neolithic occupation phase, Kovačevo Id (5790–5630 cal B.C.), is strongly related to the Neolithic on the Thracian plain and demonstrates some parallels with the site Kapitan Dimitriev (Lichardus-Itten et al. 2002).

The site Bâlgarčevo is situated in southwest Bulgaria in a transitional area between the southern and northern part of the Struma valley (Fig. 1), and it is also situated on one of the routes westwards to the Vardar valley and the cultural area around it. The position of the site makes it very interesting to trace various regional connections and influences. It covers an area of about 10 ha and the cultural layer is about 1.5 m thick. The site was occupied in the final early Neolithic (Bâlgarčevo IA and IB), middle Neolithic (Bâlgarčevo II), late Neolithic periods (Bâlgarčevo III) and early Chalcolithic (Bâlgarčevo IV) (Perniceva 2002). The radiocarbon data from the site from the early and middle Neolithic layers cover the period 5713–5531 cal B.C. to 5559–5322 cal B.C.

The tell site Gâlâbnik is situated in the upper Struma valley, in a depression between the Vitosha and Rila mountains (Fig. 1). The early Neolithic of the site has three occupation phases (Gâlâbnik I, II and III), which cover the time span between 6000/5980 and 5620–5580 cal B.C. (Boyadzhiev, in Anastasova and Pavuk 2001). The last occupation phase, from which the material discussed in this paper comes, shows parallels with the typical early Neolithic of the modern territories of Serbia, Vojvodina, and partly Bosnia (Pavuk and Bakamska 1989).

The early Neolithic occupation of tell Kapitan Dimitriev (location, see Fig. 1) was divided chronologically by the excavator into two phases—earlier and

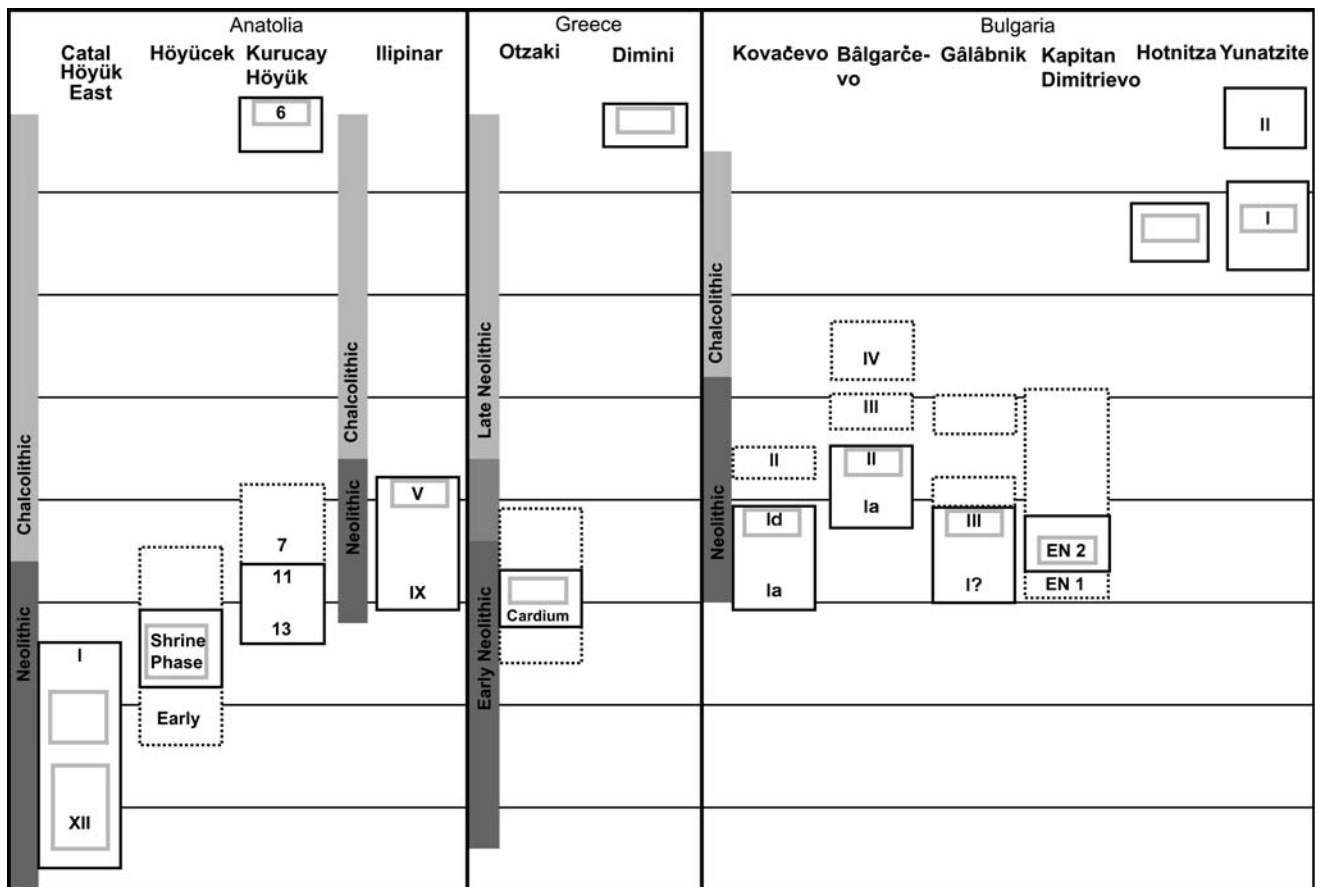


Fig. 2 Chronological settings of the sites mentioned in the text; radiocarbon data after Gôrsdorf and Bojadzhiev (1996), Boyadzhiev (2006), Reingruber and Tissen (2005), Thissen (2007), EN early

Neolithic; dotted line periods without radiocarbon data, grey rectangles the phases in which chick pea appears in the mentioned sites

later (indicated in Fig. 2 as EN1 and EN2). The material discussed in this paper comes from the second part of the early Neolithic of the site. From one of the structures where the material was found, there are also radiocarbon dates: 6974 ± 37 or $5920\text{--}5730$ cal B.C. (OxA 15642).

The Chalcolithic finds of chick pea both come from the Bulgarian late Chalcolithic corresponding to the radiocarbon age $4450\text{--}3900$ cal B.C. Tell Yunatzite is situated in the Thracian plain where (Fig. 1). From the four described occupation periods, the lowermost belongs to the Chalcolithic (Katincharov et al. 1995). A similar cultural attribution as that of Yunatzite is valid for Hotnitza situated in central northern Bulgaria (Fig. 1).

The radiocarbon dates from the late Chalcolithic horizon of Yunatzite cover the range $4693\text{--}4340$ to $4465\text{--}3952$ cal B.C. and from Hotnitza there is a radiocarbon date from the same horizon (1) from which the chick pea finds come, corresponding to the period $4621\text{--}4231$ cal B.C. (Gôrsdorf and Bojadzhiev 1996).

Methods and materials

The studied material consists of charred plant remains from dry-ground sites, which in most cases were retrieved from the archaeological layers by means of manual flotation. The volumes of floated sediment for each site are given in Table 1. The materials from the Kovačevo site originate from the excavation seasons 2003–2006, when layers from the final phases of the early Neolithic were excavated. From these layers about 450 l sediment was floated. The materials from the Bâlgarčevo site come from the excavation season 1977–1987 taken by collecting plant material from visible concentrations. An additional five samples with a total volume of 150 l were processed in 2004. The archaeobotanical materials from Gâlâbnik come from older excavations, which took place in the 1980s (Marinova et al. 2002). From this site 37 flotation samples with a standard weight of 10 kg were taken and studied. Additionally, a storage find of chick pea from a building was analysed. The archaeobotanical results from Kapitan Dimitriev

presented here originate from the excavation years 1998–1999. Eight contexts with a total sample volume of 320 l were studied (Marinova 2006).

The material from the Chalcolithic period was taken during the excavation season 2000–2003 from Hotnitza and 2003–2006 from Yunatzite, and the floated material was obtained from about 100 l sample material from the first site and about 280 l from the second one. From the site of Hotnitza, storage contexts from burnt houses were also sampled directly.

The material was studied under a binocular microscope with magnification up to 40× in the department of Botany of Sofia University and the archaeobotanical laboratory of the National Archaeological Institute, Sofia.

The radiocarbon data were calibrated with OxCal 3.1 (Bronk Ramsey 1995).

Results

Early (to middle) Neolithic finds (5900–5400 cal B.C.)

The results presented here are given in Table 1 together with the cultivated plants, as total numbers of items (frequency) and also the numbers or percentage of samples containing the items in question (presence, ubiquity). The presence of chick pea in the Bulgarian early (to middle) Neolithic sites (Table 1) seems to be similar to that (26.1% samples) in Çatalhöyük where, especially in the earlier phases, it is regarded as one of the probable leguminous crops (Fairbairn et al. 2002).

All finds of *C. arietinum* (Fig. 4a) from Kovačevo come from the occupation phase Kovačevo Id. They originate from two waste pits and from the cultural layer in general; in total there were nine seeds. *C. arietinum* was found in the layers of Bâlgarčevo II (Fig. 4b), which were considered as belonging to the middle Neolithic (Perničeva 2002). It appears at the site in 3 of the 12 different Neolithic contexts studied from this phase, in 2 houses and from sediments attributed to the Bâlgarčevo II cultural layer in general.

The finds of chick pea from the site Gâlâbnik have already been published elsewhere (Marinova et al. 2002). Relevant for the present work is the fact that they represent a storage context with over 300 seeds found in a vessel belonging to the third occupation phase covering the period 5620–5580 cal B.C. In the layers of Kapitan Dimitriev belonging to the second part of the early Neolithic, several seeds of chick pea were found in an oven and in a house (Marinova 2006, photograph published in Kreuz et al. 2005).

An overview of the pulse crops found in the Bulgarian Neolithic and Chalcolithic sites is presented in Fig. 3 by regions and periods to help to evaluate the evidence of how rare or common chick pea was in the considered area. It is

Period	Region	No. of sites studied	<i>Cicer arietinum</i>	<i>Lens culinaris</i>	<i>Pisum sativum</i>	<i>Lathyrus sat. icicera</i>	<i>Vicia ervilia</i>
Late Chalcolithic 4450–3800 B.C.	SW Bulgaria	-					
	Thrace, SE Bulgaria	10	•				•
	NE Bulgaria	4					•
	NW Bulgaria	-					
Early Chalcolithic 4900–4450 B.C.	SW Bulgaria	1	•				•
	Thrace, SE Bulgaria	7	•	•	•	•	•
	NE Bulgaria	3					
	NW Bulgaria	2					
Late Neolithic 5300–4900 B.C.	SW Bulgaria	1				•	
	Thrace, SE Bulgaria	6	•	•	•	•	
	NE Bulgaria	3					
	NW Bulgaria	-					
Middle Neolithic ~5450–5300 B.C.	SW Bulgaria	2					
	Thrace, SE Bulgaria	2					
	NE Bulgaria	1					
	NW Bulgaria	-					
Early Neolithic 2 5650–5450 B.C.	SW Bulgaria	6	•		•		
	Thrace, SE Bulgaria	5			•	•	
	NE Bulgaria	1					
	NW Bulgaria	1					
Early Neolithic 1 6000–5650 B.C.	SW Bulgaria	4				•	
	Thrace, SE Bulgaria	2					
	NE Bulgaria	3					
	NW Bulgaria	-					

Fig. 3 Leguminous crops present at the Bulgarian Neolithic and Chalcolithic sites; grey, black dots indicate storage finds, after a synopsis in Marinova (2006), supplemented by data in Marinova et al. (2002), Kreuz et al. (2005), Leshtakov et al. (2007), Popova and Marinova (2007) and unpublished data on the Neolithic site of Ohoden, northwest Bulgaria

worth mentioning that chick pea was not present in the late Neolithic and the early Chalcolithic.

Chalcolithic finds (4900–3800 cal B.C.)

The evidence of chick pea from the Bulgarian Chalcolithic period originates from two late Chalcolithic sites (Table 1). In Yunatzite single seeds (Fig. 4c), usually together with other leguminous crops, *Vicia ervilia* or *Lens culinaris*, were found. In the Hotnitza site the chick peas (Fig. 4d) come from the storage finds in two houses. From house number 1, a mixture of barley and chick pea was found. In the other house, number 6, the chick pea was mixed with a hulled wheat storage find (mainly einkorn and a few emmer grains). In the same house also inside a vessel with stored barley, single seeds of *Lens* (lentil), *Pisum* (pea) and chick pea were also found. The presence of the small quantities of chick pea mixed in the storage finds does not necessarily

Table 1 Number and presence (ubiquity) of the cultivated plants for the Bulgarian sites with *Cicer arietinum* finds

Site	Kovačevo		Kapitan Dimitriev		Bългарčevo		Gălâbnik		Hotnitsa		Yunatzite	
Period	final early Neolithic		2nd half of early Neolithic		final early/middle Neolithic		early Neolithic		late Chalcolithic		final late Chalcolithic	
Culture/Phase	Kovačevo Id		Karanovo I		Bългарčevo II		Gălâbnik III		Kodyadermen-Gumelnitsa-Karanovo VI		Karanovo VI	
Date cal B.C.	5790-5630		5920-5730				5720-5620		4621-4231		4465-3952	
No. of samples	21 (flotation)		29 (flotation)		5 (flotation) + 34 (hand-picking)		9 (flotation) + 3 (hand-picking)		4 (flotation) + 3 (hand-picking)		3 (flotation)	
Contexts	9		8		12		9		6		3	
Volume floated (l)	450		320		150 (floated)		ca. 100		100		280	
Numbers, ubiquity	No.	Ubiq.	No.	Ubiq.	No.	Ubiq.	No.	Ubiq.	No.	Ubiq.	No.	Ubiq.
Cereals (grains)												
<i>Triticum monococcum</i>	89	67%	958	100%	194	58%	31	100%	153	83%	25	100%
<i>T. dicoccum</i>	17	44%	750	100%	113	42%	27	89%	12	17%	-	-
<i>Triticum</i> sp. (hulled)	92	89%	393	100%	47	50%	7	44%	19	100%	9	100%
<i>T. aestivum/durum</i>	1	11%	12	63%	-	-	-	-	-	-	-	-
<i>Hordeum vulgare</i>	76	78%	103	88%	5	8%	7	22%	2,569	100%	5	33%
<i>H. vulgare</i> var. <i>vulgare</i>	35	44%	276	88%	1	8%	-	-	-	-	-	-
<i>H. vulgare</i> var. <i>nudum</i>	-	-	171	55%	-	-	-	-	48	50%	-	-
Pulses (seeds)												
<i>Lens culinaris</i>	78	100%	73	88%	20	25%	16	44%	5	50%	12	100%
<i>Pisum sativum</i>	9	33%	63	75%	114	33%	-	-	3	33%	-	-
<i>Lathyrus sativus/cicera</i>	50	44%	884	100%	-	-	1	11%	-	-	1	33%
<i>Vicia ervilia</i>	-	-	5	13%	4	8%	-	-	3,742	50%	1	33%
<i>Cicer arietinum</i>	9	22%	8	25%	6	26%	<300	11%	6	33%	2	67%

indicate its cultivation during this period, as shown by ethnographic studies from Greece (Jones and Halstead 1995).

Discussion

Turkey and especially the area of southwestern Anatolia are considered by many scholars as a region with closest contacts with the Balkans during the Neolithic and Chalcolithic periods. Arguments for this are the typological similarities in the material culture as well as the geographical circumstances, which together with the Aegean islands form an arc from the Taurus mountains to the Carpathians (Parzinger 1993; Nikolov 1999, 2004; Özdoğan 1997). Because there are similarities between the cultural assemblages of the Neolithic and Chalcolithic of the Balkans and north-western Anatolia the question of an interregional interaction between these regions has emerged (Özdoğan 1993; Lichter 2006). This is especially well manifested during the transition from the early to the late Neolithic of Bulgaria (Lichardus and Lichardus-Itten 1991; Nikolov 2004). In the following section, the finds of

chick pea from Bulgaria and the adjacent regions will also be discussed in the light of these connections.

In western Anatolia, chick pea appears at two Neolithic sites, namely Çatalhöyük, approximately 7500–6200 cal B.C. (Fairbairn et al. 2002) and Höyücek, approximately 6400–6100 cal B.C. (Martinoli and Nesbitt 2003). From Greece and particularly Thessaly, one early Neolithic find is known from Otzaki, approximately 6000 cal B.C. (Kroll 1981). These finds cover a period slightly preceding the Bulgarian early Neolithic finds of *C. arietinum* (Fig. 2).

The Chalcolithic in western Anatolia begins earlier than in Bulgaria and is at least partly contemporary with the early Neolithic in Bulgaria (Fig. 2). Finds of chick pea from western Anatolia come from the early Chalcolithic of Ilipinar, and are dated from 6700–6545 B.P. to 6605–6580 B.P., or about 5630–5407 cal B.C. (Cappers 2001). They are more or less synchronous with those from the Bulgarian final early Neolithic (Fig. 2). The chick pea finds in Ilipinar originate from storage contexts, one of them dominated by *C. arietinum*.

Until now, there is no evidence for *C. arietinum* from the Neolithic of neighbouring areas further to the north-west, in modern Serbia and Romania (around 5800–5600

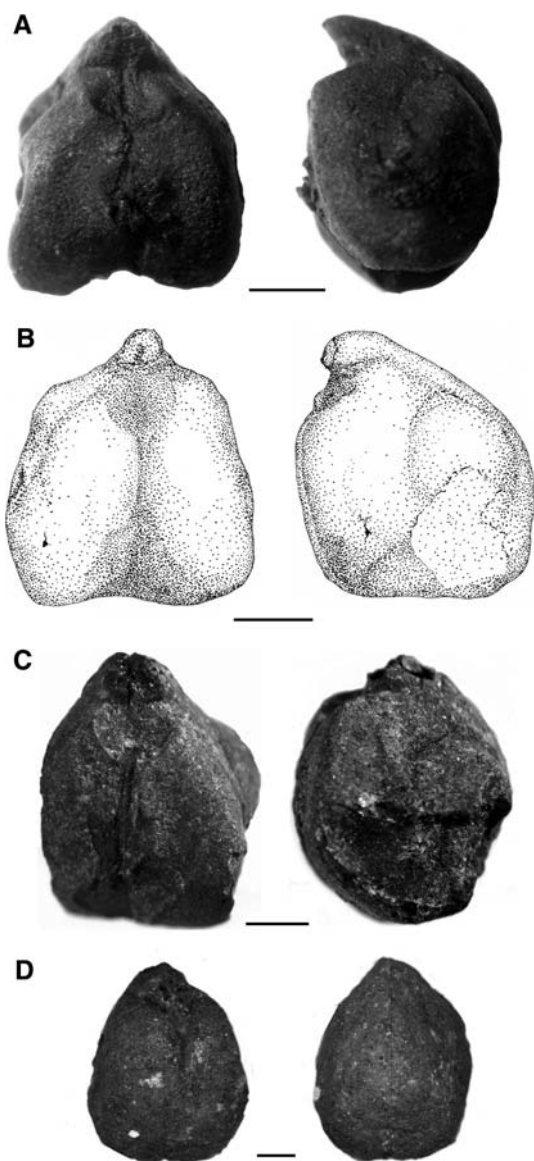


Fig. 4 *Cicer arietinum*. **a** Kovačevo, **b** Bâlgarčevo, **c** Hotniza, **d** Yunatzite (scale 1 mm)

cal B.C.) but this could be connected with the state of knowledge and may not necessarily mean that chick pea was absent there. This hypothesis can also be supported by the finds of chick pea in the layers of Gâlâbnik III and Bâlgarčevo II, which are strongly related to the Neolithic cultures of Serbia and adjacent territories to the west.

It is important to mention that in the early (to middle) Neolithic of Bulgaria, chick pea is mostly present as single finds (Table 1). A possible explanation for this could be that all these few grain finds are intrusive from later periods. However, considering the regular occurrence at several sites (presences reaching 26% of samples) and also the chick pea storage context at

Gâlâbnik, this explanation can be ruled out. Therefore, a probable option is that the finds from the Bulgarian early Neolithic correspond to direct contacts with Anatolia, which took place through the eastern part of the study area and not necessarily through Thessaly. One hint for this could be that the earliest radiocarbon date for a Bulgarian chick pea finds comes from the easternmost site, Kapitan Dimitriev (Fig. 1). Also, the evidence based on pottery of contacts with Anatolia and Thrace established at Kovačevo Ic and Id (Lichardus-Itten et al. 2006) could argue for this hypothesis. Given the scarce evidence available, further studies are needed to confirm this suggestion.

Later finds of chick pea from Bulgaria all come from the late Chalcolithic (Fig. 2; Table 1). These finds are however somewhat earlier than Anatolian finds of chick pea which originate from the late Chalcolithic of Kurucay Höyük, 3600–3300 cal B.C. (Nesbitt 1996). Roughly contemporary are chick pea records from the late Neolithic Dimini in Greece (Thessaly), approx 3500 cal B.C. (Kroll 1979).

Between the finds of chick pea from the second part of the Bulgarian early Neolithic and those from late Chalcolithic, no further chick peas have been found until now (Marinova 2006; see Fig. 3). In this context it is important to note that the recent and thorough studies of several mainly late and final Neolithic settlements in northern Greece did not provide any finds of chick pea either (Valamoti 2004). Northern Greece is a geographically adjacent area, which shows close cultural parallels to southern Bulgaria during the Neolithic period. Therefore it is not astonishing at all that the evidence from these regions fits very well together concerning the presence, or in this case absence, of chick pea.

Also, recent intensive archaeobotanical studies in the Neolithic of Bulgaria and especially in the less investigated southeastern part of the country did not reveal any new finds of chick pea. The last two excavation seasons (2006–2007), and ongoing studies, with the excavation of several houses and great parts of the late Neolithic to early Chalcolithic sites Dana Bunar II and Provadia (Marinova, unpublished), have provided plenty of information on the cultivated pulses in eastern Bulgaria. There, however no chick pea has been found until now. Also in the early Neolithic site of Yabalkovo in southeastern Bulgaria where about 123 flotation samples were taken, no chick pea was found (Leshtakov et al. 2007). This poses the following question: was chick pea cultivated just in particular areas of cultural influence? We think that more data are needed to obtain a more reliable answer.

Another question is whether *C. arietinum* was used continuously in the study area during the whole considered period or it was grown only during certain phases of the early Neolithic and the Chalcolithic? The existing

evidence—the absence of chick pea in all of the studied 27 Bulgarian late Neolithic and early Chalcolithic sites (a summary of these sites is given in Marinova 2006) points to the fact that chick pea was only present in some phases. In this context, however, it should not be forgotten that also due to its large size the charred chick pea seeds are more susceptible to breakage than the small pulses such as lentils and *Vicia ervilia* (bitter vetch) and this in some cases hampers their identification in the archaeobotanical record (Helbæk 1959; Tanno and Willcox 2006). Considering the different extents of analysis of the various sites, it should be stressed that further research and evidence are needed to verify this suggestion.

The last important question to answer is whether chick pea was a crop plant in the phases when it was present, or whether it appeared just as a weed in the crops? The occurrence of the chick pea only in a short phase around the final Bulgarian early Neolithic and the start of the middle Neolithic, as well the late Chalcolithic, supports the suggestion that chick pea was mostly a weed. It might have been imported with other crops during more intense contacts with Anatolia during these periods.

Conclusions

The finds of chick pea presented in this paper show that the variety of pulses used in Bulgaria and the adjacent regions during the Neolithic and Chalcolithic was greater than previously thought. Moreover, they confirm the importance of pulses in the area for the periods discussed (Table 1). The recent finds give detailed information on the spread of the chick pea, a leguminous crop which is part of the Near Eastern founder crop assemblage, and show that its spread during the Neolithic also reached the parts of the Balkan peninsula lying outside the Mediterranean area. Its appearance is most probably connected with the cultural processes during the second part of the Bulgarian early Neolithic (5700–5500 B.C.) in which repeated contacts with Anatolia have been observed in the archaeological record. The finds of chick pea from the Chalcolithic period could suggest both continuous cultivation in the study area or repeated introductions through contacts with neighbouring areas.

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