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Mesolithic Agriculture or Neolithic Expansion in the Northern Balkans: the case of Iron Gates

ALEXANDRU DINU*

Key words: Iron Gates, Danube, Mesolithic, Mesolithic-Neolithic transition, agriculture.

Abstract: This paper reviews the hypothesis of Mesolithic agricultural practices at the northern shore Lepenski Vir – Schela Cladovei culture sites of the Danube Iron Gates. Such possible economic development is considered against more recent radiocarbon dates corroborated with archaeobotanical studies, information on site location and habitation, natural environment, and agricultural tools and facilities present or absent in the archaeological record. The study concludes that the Mesolithic period at the Iron Gates cannot be associated with any of the economic developments defining even an incipient stage of agricultural practices.

Cuvinte-cheie: Porțile de Fier, Dunăre, mezolitic, tranziția de la mezolitic la neolitic, agricultură

Rezumat: Acest articol revizuieste ipoteza practicării agriculturii în perioada mezoliticului, cultura Lepenski Vir – Schela Cladovei, pe malul nordic al canionului Dunării la Porțile de Fier. O asemenea dezvoltare economică este considerată a contrazice date radiocarbon mai recente coroborate cu rezultate ale unor studii arheobotanice publicate anterior, informații despre locația și locuirea siturilor, mediul natural, unelte și implementări agricole prezente sau ce ar fi trebuit să fie prezente în contextual arheologic. Studiul conține că mezoliticul de la Porțile de Fier nu poate fi asociat în niciun fel cu o dezvoltare economică ce ar putea fi definită măcar ca un stadiu incipient al practicilor agricole.

1. Introduction

Danube's Iron Gates canyon is a region of highly diversified biotopes; having a mild climate, it permits the existence of more southerly species of plants and animals (Comitetul de Stat al Apelor 1967, Grupul de Cercetări Complexe Porțile de Fier 1976, Institutul de Geologie și Geografie al Academiei Republicii Socialiste România 1969). Consequently, the entire area of the defile appears to have been an ideal setting for Mesolithic groups practicing a hunting and gathering economy. It has been suggested, however, that the local Mesolithic groups may have experienced with the management of animals (Bolomey 1973a, Bolomey 1973b) and

plants (Boroneanț 1970, 1973b, 1973c, 1990, 2000b; Boroneanț and Boroneanț 1983; Cârciumar 1973a, 1973b, 1996; Păunescu 2000) before the appearance of the Neolithic Starčevo in the region.

Although the possibility of Mesolithic animal management has been subsequently refuted for the sites on both sides of the Danube (Bartosiewicz *et al.* 2006, Boric 1999, 2002, 2004; Boric and Miracle 2004; Dinu *et al.* 2006, Dinu *et al.* 2008), it appears that the possibility of early agriculture at Mesolithic Iron Gates still needs clarification.

Most regrettably, detailed studies of possible agricultural developments for the European Mesolithic sites are still scarce or inconclusive (Behre 2007). In this context, for some parts of the continent, local agricultural advances are still advocated to be present at a time far earlier than evidence of Neolithic settlers:

In fact, the so-called "Neolithic package" is well at home in Southeast Europe, in the Balkans area during the Mesolithic times (10000–7000 cal BC).

(Seferiades 2007)

The scenario of indigenous plant domestication and cultivation during Mesolithic in the northern Balkans region has been developed by Yugoslavian archaeologists during the early years of excavation at the Iron Gates, synthesized and published later in English (Srejovic 1988). The Romanian archaeologists adopted and perpetuated the model (Boroneanț 1973b, 2000b; Boroneanț and Boroneanț 1983; Cârciumar 1996; Păunescu 1996), even if it has been generally agreed (Boroneanț 1970, 1973b, 2000b; Jovanovic 1969, 1972; Mogoșanu 1978; Păunescu 1970, 2000; Prinz 1987, Radovanovic 1996a, 1996b; Srejovic 1965, 1972; Tringham 2000) that the conditions for practicing agriculture in the Iron Gates region have been always poor:

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The exploration of the Danube Gorges... led to a series of quite unexpected and impressive finds in a terrain that was quite inhospitable for agriculturalists both prehistoric and modern. (Tringham 2000, p. 33)

The role played by the Mesolithic groups in the adoption and spread of the “Neolithic package” across many parts of Europe has become in the last decade an increasingly accepted truth (Bogucki 2000, Bogucki 2004; Plucennik 1998; Price 2000; Ruiz 2005; Tinner *et al.* 2007; Vencle 1986; Zvelebil 2000). However, the region of the Balkan Peninsula, as well as along the Danube valley into the interior of the continent, and along the northern Mediterranean shore, the situation appears to have been more difficult to interpret: the spread of the Neolithic economies was rather to be associated with the spread of the Neolithic groups (Davison *et al.* 2006; Gronenborn 2007; Guilaine and Manen 2007; Keeley and Golitko 2004; Price *et al.* 2001; Runnels 2004; Zilhao 2000, 2004). At present, the known Mesolithic sites south of the Danube are few, and evidence of plant and animal management is, at best, circumstantial (Galanidou and Perles 2003; Jacobsen and William 2000; Perles 2001).

This study will bring evidence that no agricultural developments can be associated with the Mesolithic economies at the Danube’s Iron Gates northern shore. Rather, it proposes that the earliest evidence of agriculture in the region of the northern Balkans as part of the “Neolithic package” can only be attributed to the development and spread of the Starčevo Neolithic culture sometime by 6400–6000 BC.

2. Temporal frame

The implications of practicing agriculture during the Mesolithic at Iron Gates have never been mentioned by any of the Romanian archaeologists advocating such economic development. Considering more recent studies, the Neolithic Starčevo appears to have been present in areas of north-central Balkans by 6400–6200 BC (Boric 2007; Boric and Dimitrijevic 2007; Whittle *et al.* 2002); apparently, Starčevo Neolithic penetrated the region of Iron Gates only by 6000 BC (Bonsall *et al.* 2004; Boric 2005, 2007; Boric and Miracle 2004).

On the other hand, some of the Mesolithic Schela Cladovei culture perforated antler tools labeled as agricultural uncovered at the Iron Gates can be associated (in accordance to the information inscribed on them by excavator Vasile Boroneanț) with material dated as early as 8400–8300 BC (Table 1). In this case, Danube’s canyon could be considered a pristine center of plant domestication. This temporal discrepancy may create a serious

confusion considering the subject of origins of agriculture and the Mesolithic-Neolithic transition in Europe.

Table 1
Depths and AMS dates stratigraphically associated with perforated antler tools from Icoana (Dinu *et al.* 2007)

Site	Depth (-m)	C14 BP	AA#	C14 BC (one sigma)
Icoana	0.7			
Icoana	0.8			
Icoana	0.9	9196±89	65558	8490-8300
Icoana	1	8840±86	65559	8010-7810
Icoana	1.2	8907±98	65562	8250-7940
Icoana	1.4	9403±93	65564	8820-8540
Icoana	1.55	9101±87	66586	8450-8240
Icoana	1.6	8989±88	65565	8290-8160
Icoana	1.65	8952±88	65566	8130-7970

One aspect that may favor the idea of local agricultural developments is that the earliest Neolithic Starčevo pottery found on the northern shore of the Iron Gates, at Cuina Turcului (Lazarovici 1979, Păunescu 1978), is typologically older than the one uncovered at other early Starčevo sites of southern Romania, as Cârcea, Gârlești, Grădinile, Măgura, Trestiana, not far east from the Iron Gates, and, Gura Baciului and Foeni-Sălaș in Transylvania (Comșa 1987; Lazarovici 1979, 1995; Mirea 2005; Nica 1976, 1977, 1981, 1993; Nica *et al.* 2001). Considering the material excavated at these sites, it appears that Starčevo groups, after reaching regions of southern Danube, to have first spread east and north of the Iron Gates, reaching Cârcea, Grădinile, Gârlești, in southern Romania by 5850–5720 BC (Mirea 2005, p. 48) and Foeni-Salas, and Gura Baciului in Transylvania by 6300–6000 BC (Biagi *et al.* 2005, p. 46) (fig. 1, 1).

Despite the fact that the Mesolithic-Neolithic transition at the Romanian Iron Gates sites has been the subject of a number of studies (Bonsall *et al.* 1997, 2000, 2002/3, 2004; Boroneanț and Dinu 2006), and that an increased number of radiocarbon dates have been published in the recent years (Bonsall *et al.* 1996, 1999, 2000, 2004; Dinu *et al.* 2007), the Early Neolithic of the Iron Gates northern shore remains practically undated. Moreover, there is only one Mesolithic site, Icoana (Figure 1, 3), that has been the subject of a more thorough radiometric investigation (Dinu *et al.* 2007). Fortunately, at the same site were uncovered a substantial number of possible agricultural implements. Due to post-excavation preservation conditions, none of these could be dated directly; the dates were obtained by running animal tooth samples from the same levels of excavation.

3. Sites location and agricultural conditions

Perhaps it is worth mentioning that evidence for Mesolithic sites in the Balkans is scarce and poorly documented, except for the Iron Gates region. In this area, contrary to some opinions (Seferiades 2006), no remains of Mesolithic Lepenski Vir – Schela Cladovei culture were uncovered at sites Cuina Turcului and Climente II (Boroneanț 1970, 1973a, 1973c, 2000a, 2000b; Păunescu 1970, 1980, 2000). The northern shore sites associated with this culture are: Alibeg (Pescari), Veterani Terasa, Icoana, Răzvrata, Ostrovul Banului, Schela Cladovei, Ostrovul Corbului, Ostrovul Mare.

Generally, the discussion of plant cultivation at Iron Gates failed to consider the aspects related to site location, permanent residence, and suitable agricultural conditions. There are some sites, like Schela Cladovei and Răzvrata, that are located in places where practicing agriculture at, or close to the site, could have been possible. Others, like Ostrovul Corbului, Ostrovul Mare, and Ostrovul Banului, were located on islands large enough for such activities to be successfully practiced. The size of these sites, however, and the nature of the uncovered material point out towards a scenario more consistent with a very small group of people, perhaps some 10–15 individuals, who spent a very limited time there. According to some opinions, it is more likely that these sites to have been reoccupied and deserted a number of times (Mogoșanu 1978, Păunescu 1996).

There is another category of sites like Alibeg, Icoana, and Veterani Terasă, where agriculture was impossible at the site, or close to it, due to the nature of the terrain. These sites were located literally between the base of the canyon wall and the river shore. None of the sites (except, perhaps, for Schela Cladovei, that has a more opened location) logically fulfills site location requirements for year-round occupation. Moreover, except for Veterani Terasa, the sites were in constant danger of flooding by the river, and enduring difficult winter conditions due to the occurrence of river shore icing or the complete freezing of the river.

It is therefore safely to suggest that these sites were more likely to have been occupied on a seasonal basis, or, intermittently for longer periods of time. The noticeable absence of human remains at these sites may offer an argument in this direction. From Schela Cladovei and Lepenski Vir it was understood that the dead were buried at the site. Besides Schela Cladovei, which presents a high number of human skeletons (Bonsall *et al.* 1996, 2000, 2004; Boroneanț 1973c, 1999, 2000b;

Mirițoiu *et al.* 2004), on the Romanian shore it is only at Icoana where scant remains of 9 individuals were found (Dinu *et al.* 2007). Many of these were buried at the site not because of natural death, but as a dramatic result of violent action, apparently rather spread phenomenon during Mesolithic at Iron Gates on the both shores of the river (Boroneanț and Nicolăescu-Plopșor 1990; Nicolăescu-Plopșor 1976; Roksandic 2004, 2006). It appears therefore that the residence pattern is rather inconsistent with the practice of agriculture.

Also noticeable is the inexistence of agricultural products or other storage facilities at all sites, and there are several aspects that must be noted in relation to this absence. Certainly, working the fields it not the type of activity that happened all of a sudden. It can be assumed that such a process implies innovation and development of the agricultural implements, especially in a terrain like the one at the Iron Gates. Logically, it must offer a profitable result based on the work input in preparing a plot large enough to insure a large harvest, harvesting, transportation, preparation of storage facilities, the number of individuals involved, the amount of time and energy invested, the size of the harvest as resources insurance for less favorable seasons of the year and crop failure, and seeds for the following year. Obviously, the harvest was not consumed all at once; storage facilities must be an integrated part of the process.

4. Tools and seeds

Probably the most striking aspect related to the possibility of agricultural practices is represented by the presence of perforated or simple digging antler tools uncovered at all Romanian Iron Gates Mesolithic sites, considered to be diagnostic Mesolithic Schela Cladovei culture tools (Boroneanț 1970, 1973a, 1973b, 1973c, 1980, 1990, 1999, 2000b; Cărciumaru 1996; Păunescu 2000, 2001). These antler tools were labeled as agricultural because similar artifacts were associated with some Romanian Neolithic cultures such as Sălcuța, Gumelnița, Verbicioara, and Coțofeni. By analogy, the function of the Mesolithic Schela Cladovei antler tools was thought to be the same. A complete inventory by site has been offered by other authors (Păunescu 2000, 2001).

The great significance of these tools resides in the fact that at Iron Gates they occur only in the Mesolithic strata; all remains stratigraphically associated with them were labeled as belonging to the Mesolithic period. The stratigraphy of the site Icoana (Boroneanț 2000b; Dinu *et al.* 2007;

Păunescu 2000) testifies for the presence of these tools from the lowest Mesolithic levels to the upper ones virtually unchanged over the millennia. It also appears that there is not only a stylistic uniformity over time, but that they show up suddenly, marking the appearance of the Mesolithic Schela Cladovei people in the area.

The hypothesis of the agricultural use of these implements as some sort of simple field working tools was strongly supported by some Romanian archaeologists (Boroneanț 1973a, 1973b, 1973c, 2000b; Boroneanț and Boroneanț 1983; Păunescu 1996, 2000) in great part based on pollen analysis (Cârciumaru 1973a, 1973b). They were classified into three categories: hoes, planting tools, and plowshares, and placed in an economic context similar to the Mesopotamian and Egyptian model of agriculture, being suggested that the lowland alluvium along the Danube and some of the tributaries was “plowed” and seeded after floods receded (Cârciumaru 1996). Furthermore, the pollen analysis performed for the site Icoana (Cârciumaru 1973a, 1973b, 1996) of *gramineae* pollen type *Cerealia* (Cârciumaru 1996, p. 129–130) indicated that samples were present for each micrometric category larger than 38.5 μ , and that their number increased through each cultural stratum between 6000–5000 BC. Only two radiocarbon dates were available at the time, and Carciumaru does not specify how the temporal frame was established.

Considering the location of Icoana, plant cultivation at the site was impossible; the site was located literally at the base of the canyon wall, between the mountain and the river shore, on a dirt and rocky debris beach of about 10m wide and 10–12m long. Moreover, if *Cerealia* sp. were to be cultivated somewhere else and crop brought in, there were very few choices considering the relief: either Mraconia (river) Depression, or along the shore of Ogradena Gulf, both inconveniently distanced from Icoana (Figure 3). Perhaps, our modern logic has sometimes difficulties matching some of the decisions taken by the ancient people; however, this is a case where the practical spirit of these Mesolithic groups should not be doubted.

Other authors adopted Carciumaru’s classification antler tools, and differentiated the hoes into three categories according to the angle of the “blade” and the possibility of attaching a handle (Păunescu 1996, Păunescu 2000). It has been even suggested that this kind of “primitive plow hoes were used either by pushing or pulling” (Păunescu 1996, p. 143). Considering the faunal archeological record

(Bartosiewicz *et al.* 2006, Bolomey 1973a, Bolomey 1973b) the pull-push action could have not been performed by other than humans; it remains extremely unclear why these people were so eager to perform such tenuous and unproductive activity.

It has to be mentioned that according to subsequent palynological analysis (Mason *et al.* 1996) at the Schela Cladovei site for the Mesolithic strata, the conclusion was:

...no domestic cereal grains... were present in these samples...which consisted mostly of roots/tubers and seeds/fruits.

(Mason *et al.* 1996, p. 12)

One other major aspect of the plant cultivation question is the absence of harvesting and trashing tools. The existence of plowing-digging tools must not be understood as an unilateral technological development. Harvesting tools should have been developed in parallel. An exhaustive lithic analysis (Păunescu 2000, 2001) for all the Iron Gates sites revealed no stone tools or microliths that could have been used, either directly or as parts of other implements, for harvesting grasses. Moreover, according to our investigation, in the archaeological material available at the Institute of Archaeology in Bucharest there is no evidence of stone, bone and antler tools or parts associated with tools, that could have been used in harvesting grasses at any of the Mesolithic sites listed in this paper.

Some Romanian archaeologists (Boroneanț 1973b, 1973c; Boroneanț and Boroneanț 1983; Cârciumaru 1973a, 1973b, 1996; Păunescu 2000) also bring up questions regarding the grinding stones uncovered at some of the sites. A few of these stones are very big and extremely heavy. It is most regrettable that no wear or residue analysis was performed on any of these stones. Some of them have small concavities approximately the size of a chicken egg or perhaps a little larger (Fig. 4), but obviously too small for processing any quantities of grain. Rather, these stones could have been used for purposes as cracking hazelnuts, acorns, perhaps smashing plant parts or roots in order to prepare arrowhead poison, for processing wild fruits, roots, and fibrous parts of plants. If these stones were indeed used for grinding grains, than the archaeological record should have revealed greater amounts of seeds, and a presence of either predomesticated or domesticated seeds mixed up with weed seeds (Weiss *et al.* 2006, p. 1608–1609), none of which were identified at the Mesolithic Schela Cladovei sites.

Undoubtedly, resources like various edible plants and their roots and leaves, berries, wild fruits, small mammals, birds and eggs, clams, mollusks were an important part of the economic life of the Iron Gates Mesolithic groups. The fact that there is little evidence for the incorporation of such dietary groups into the daily menu of these people does not mean the exclusion of such category. Gathering was probably an extremely important activity undertaken by the entire group: men, women, the young, and the old. It is only normal that various tools were used for these activities, but evidently also for the processing of food.

5. Conclusion

Discussing archaeobotanical evidence for early agriculture, some authors pointed out that predomestication cultivation was practiced at some Near Eastern pre-pottery Neolithic sites. Such scenario offered a differentiation between plant “gathering”, “cultivation”, and “domestication”. It has been suggested that of these three stages, the most important was the second, during which genotype accumulation lead to domestication, but also that in many instances the three stages cycle was not completed, the process being abandoned during the second stage (Weiss *et al.* 2006).

Could be that the Mesolithic groups of the Iron Gates to have experimented with plant cultivation, but not domestication? Considering the archaeological record as presented in this paper, it is unlikely. Even if the Iron Gates may have offered a great diversity of resources to hunting-gathering communities, the practice of agriculture, especially at early times, was never suitable to the natural conditions of the region. The existence of flat grinding stones should not be undoubtedly associated with grain processing; similar ones were used to shape and sharpen antler tools in many sites of the Upper Paleolithic Dnestr river (Borziyak 1993) and Prut river (Brudiu 1987). Moreover, antler tool occurrences similar to the ones from Iron Gates were signaled at other Mesolithic sites across Europe in circumstances that exclude agricultural activities ; such tools were suggested to have been used for shaping bows and spear shafts (Clutton-Brock 1984) or for gathering activities (Borziyak 1993). It appears, therefore, that the agricultural tools may have been, in fact, used in a larger context, fulfilling requirements of gathering and processing food, and tool and weapons making, rather than work in the fields.

Considering the evidence presented in this study, it appears unlikely that agriculture to have been practiced at the Romanian sites of the Mesolithic Lepenski Vir – Schela Cladovei culture. Rather, evidence for a food producing economy is not present on the northern shore of the Iron Gates until the Starcevo Neolithic groups settled the canyon; most probably, the earliest settlement being cave Cuina Turcului. The same appears to be true for the southern shore of the Iron Gates canyon (Boric 2005, 2007; Boric and Dimitrijevic 2007).

At a larger scale, it can be stated with maximum of confidence that no general model for the Mesolithic-Neolithic transition in Europe can explain the complexity of this process. The data shown by this study supports a model more consistent with a demic Neolithic spread in the Balkan Peninsula, that cannot be applied in other areas of the continent. Rather, this transitional process must be understood by considering the regional Mesolithic factor as playing the key role in remodeling the economic and social geography of Europe.

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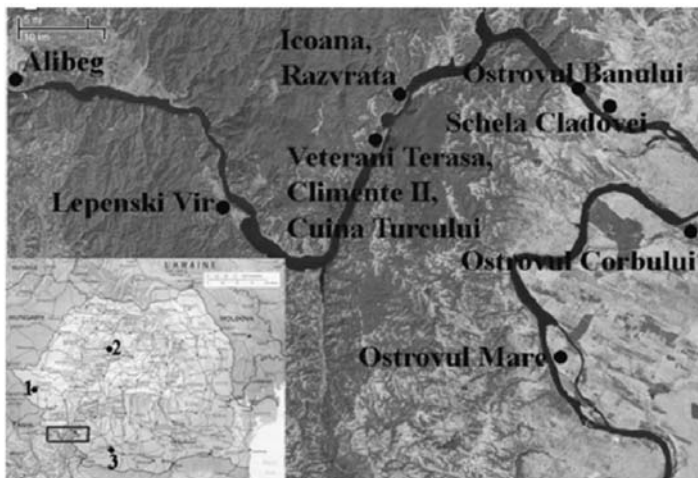


Figure 1. Location of sites presented in this paper



Figure 2. Perforated antler tools from Icoana



Figure 3. Location of sites Icoana and Razvrata, Ogradena Gulf, Mraconia River Depression



Figure 4. Grinding (?) stone from Icoana