

The *Chora* of Kerkinitis¹

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Palaeogeographic conditions

The Greek colonisation of the northern Black Sea littoral coincided with the transition from the Subboreal to the Subatlantic period. Because of this, the climate of the region was cooler and more humid at that time than it is now. According to A. Dzents-Litovskij's estimations, which were based on studies of sediments from Saki Lake and other salt lakes of the Crimea, warm weather was constant there until the end of the 2nd and the beginning of the 1st centuries BC. This necessitated a change in the choice of preferred crops.²

Palaeobotanic conditions

During excavations in Kerkinitis carbonised remains of eleven different crops were found. Wheat, among which three varieties of *Tr. aestivo-compactum* – light, dwarf and a transitional sort – predominate, is the most common find. As the basic bread crop in the Crimea during antiquity, it was probably best adopted to the local soil and climatic conditions as well as to the agriculture techniques used in the area. In Z.V. Januševič's opinion, the above-mentioned cereals were synonymous with the light Pontic wheat mentioned by Teophrastos and the small-grained wheat named by Plinius.³ The coastal plain adjoining Evpatorija matches well the requirements of ancient agronomists for lands where wheat ought to be sown. *Tr. dicoccum* is the second most common sort of wheat, although it makes up only 1.82% of the finds from the Greek layers of Kerkinitis.⁴ It was cultivated on a larger scale for a short period of time in the second half of the 2nd century BC when the town was captured by the Scythians. This fact testifies to a complete change in preferred crops. As well, the presence of seeds from various weed types in the finds points to the lower level of Scythian agricultural techniques.

Along with wheat, barley (*Hordeum vulgare polystichum*) had a significant share in the composition of crops grown, as a basic fodder crop. Some rye seeds found in the Scythian layers of the site allow a supposition that this type of grain was also grown. *Vicia ervilia* and lentils are represented by separate seeds. Grape seeds found in our samples come from the layers from the 5th century BC, well before the territory was mastered by Chersonesos.⁵

Organisation of arable lands

Apparently, the whole territory of the Kerkinitian *chora* was divided into separate plots by means of small shallow ditches or low earthen walls. Remains of this land division stretching 6 to 8 and sometimes 11 km inland near the Cape of Evpatorija are traceable on aerial photographs.⁶ There the allotments of quadrangular form (rarely square or right-angled but more often trapezoid) appear to be separated by narrow deep strips, which, as proved by excavations at the Majak settlement, were dividing ditches.⁷ Most of the plot boundaries are curvilinear and are oriented at an angle to each other, which is why the adjacent allotments differ in their layout. This irregular planning contrasts very much with the very consistent system of the Chersonesean land division and probably represents real traces of an early cadastre of Kerkinitis. This system, having once been established, was subjected to hardly any change in the following period of the Chersonesean supremacy.

Farmhouses

A very large settlement consisting of individual rural houses was situated on the bank of the Moznak Lake. Unfortunately, the majority of these building complexes have only been partly explored. Only a single block of farmhouses grouped together has been completely excavated, by L.A. Moiseev in 1917. The rooms of these houses were disposed along the perimeter of a large courtyard, while in the corner of one of the houses the foundation of a circular tower was found. Unfortunately, none of the investigators tried to link these farmhouses to specific land plots, and at present, such a linkage is impossible since all the remains are now covered over by the modern-day city of Evpatorija.⁸

Tillage, harvesting and storage

The evidence for tillage, harvesting and storage on the *chora* of Kerkinitis is scant, so we mainly have to resort to descriptions of pan-Hellenic practices. The location of Kerkinitis near the salt lakes made possible not only the fertilizing of the soil by the addition of ash, but also the widespread use of well-silted ground. It also facilitated the mining of gypsum, which was necessary, for example, for winemaking and the preparing of spelt groats. The quantity of storage facilities excavated in the city itself, as well as the number of farmhouses known to us at present, is certainly too small to hold the entire hypothetical harvest. Probably, that portion of wheat, which was intended for export, was shipped a few months after harvesting, most probably during July through September. In this case, the corn set aside for sowing ought to have been kept in the garrets or on the upper floors of the houses, as advised by Columella.

Farming system

Usually, it is believed that a two-field system was mainly employed in the Graeco-Roman world.⁹ As mentioned above, light-dwarf wheat was the basic cereal in Kerkinitis. As can be judged from the smaller dimensions of the seeds when compared to subsequent specimens, under the colder climate of the first two centuries of the *polis'* existence, wheat was likely sown as a spring crop. This would correspond best to the optimal conditions for its cultivation. According to palaeobotanic data from the rural sites of the north-western Crimea (Panskoe, Masliny), some changes in agriculture occurred at the turn of the 4th and 3rd centuries BC. These finds revealed rye and its constant concomitant weed, *Lithospermum arvense* L. This suggests that at the moment of the sudden destruction of the sites in the 270s BC rye had surpassed wheat as a major crop.¹⁰ Such important changes in the composition of crops, namely a transition from spring- to winter-sown crops, enable us to conclude that a slight warming of the climate took place at this time (a transition from a chilly-and-humid to a warm-and-dry phase, according to A.V. Šnitnikov 1969, 113).¹¹ In other words, a gradual accumulation of changes in natural conditions (for example, the change in the rate of precipitation) resulted in qualitative changes in the environment. In our case, this could imply the movement of geographical zones approximately by one degree, i.e. about 100-150 km.

The selection of crops which were encountered in archaeological layers of Kerkinitis allows the supposition that from the second half of the 5th century BC a more progressive three-field system must have been employed there. This most likely contained the following stages of rotation: 1) fallow; 2) spring or winter wheat, during the 3rd century BC probably supplemented by winter rye; 3) spring barley.

According to late-19th-century Crimean practice, the worst fields were set aside for barley: the stubble but relatively clean field of winter wheat after fallow. At the early stages of the *polis'* existence, when free lands were available, a shifting system of cultivation was probably employed. It could not have been practiced, however, for a long time, since the *polis* would have begun early on to strictly regulate quickly waning resources of land.

Crop productivity

The question of crop productivity is a complicated one, rarely discussed in the literary sources apart from a well-known remark of Strabon concerning the exceptional fertility of the soils on the plains of the Crimea (Strab. 7.4.6.). Moreover, because of very different geographical conditions, we are deprived of the possibility of using what little data we do have from the ancient agronomists of Greece and Rome in our consideration of the crops of this area. The crop rotation and the selection of grains in the second half of the 4th to the 3rd centuries BC virtually coincide with those of the final third of the 19th and the

beginning of the 20th century Crimea. Given the lack of mechanization and the predominance of extensive agriculture in the Tavričeskaja Province (Crimea in the Russian Empire), it seems possible to compare these two examples, even though they are distant in time from each other. For that purpose, the modern productivity indices of the peninsula's basic cereals over a half-a-century period (late 19th and early 20th centuries) have been collected. According to these data, during this 47 year period an average yield of winter wheat was 7 hl/ha, and that of barley amounted to 5.7 hl/ha. The analysis of the statistics available to us surely testifies to an extremely fluctuating productivity in the growth of cereals. Given a low standard of agriculture techniques, the rapid oscillations in yields completely depend on climatic conditions.¹²

Cattle-breeding

Despite the relatively small quantity of palaeozoological remains studied, these remains represent practically all species of domestic animals reared in the cities and rural sites of the northern Black Sea littoral. Unfortunately, the small amount of material does not permit the evaluation in full of the significance of individual species to the *polis'* economy. In the domestic herd, cattle seemingly predominated, followed closely by small cattle. A comparison with modern data is more complicated, since in calculations of cattle stock, for example in the Tavričeskaja Province, one head of cattle was equated to ten head of small cattle. In our finds, the remains of goats (8.3%), pigs (13.9%), horses (8.3%) and donkeys (5.6%) are represented in small quantities. The small percentage of horses probably indicates that this animal's role as a source of food was hardly of any importance and it must have mainly been used for transportation. Even a small quantity of domestic animals, however, could hardly have been accommodated in houses within the precincts of the town and would surely have required some cattle-rearing facilities outside the city walls.

Palaeoeconomic model of the chora development

The actual size of the Kerkinitian *chora* is unknown; partly because it quite early on became a part of the remote *chora* of Chersonesos and, consequently, was slightly transformed and partly because its core part is now hidden under the modern day city of Evpatorija.

Let us then approach this problem from another point of view – taking as a point of departure the minimal necessities required for the normal maintenance of a small *polis* such as Kerkinitis. The central point of this reconstruction is based on my estimate of the city's population in the middle of the 4th century BC, which amounted to c. 2,000-2,200 people.¹³ This, in turn, is based on the analysis of the density of the buildings and the city's accommodation capabilities. The second point in our analysis is the estimation of an annual

average consumption. In the Tavričeskaja Province in the first half of the 19th century, the average consumption rate was set at 310 kg of wheat per person per year. Based on this rate, the annual consumption of the whole population of Kerkititis would make up 620-682 tonnes of wheat. With an average yield at seven hectolitres per hectare such a quantity of wheat can be produced on an area of about 877.6-965.3 ha, and, in the case of a fallow system, on an area of about 1,755.2-1,930.6 ha. Taking into account the amount of grain to be produced for export, these figures should be enlarged by c. 30%, thus making up 2,281.8-2,509.8 ha. Sowing a half of this area at a rate of 112.8 kg per hectare would require an additional area of 420-470 hectares to produce seeds. This leaves us with a total of 2,700-2,980 ha.¹⁴

In the 19th and early 20th century about one third of the sown area in the Evpatorija District (32%) was set aside for barley. Since fodder crops occupied a half of the cultivated territory (51%) and the Kerkititians did not cultivate oats and maize, all of this territory (1,350-1,490 ha) could have been planted with barley. Such a high percentage of barley was assuredly connected with a fairly high stock of cattle. The last fact finds an explanation in the quality of Crimean soils – dense and laborious for tillage due to the compact thickness of the chernozems and their underlying loams. Their ploughing normally required three to five pairs of oxen.¹⁵

In spite of the Kerkititian agriculture's specialization in grain-producing, a certain area (about 10% of the whole area of c. 4,050-4,470 ha) was probably reserved for the production of secondary crops, namely emmer (*Tr. dicoccum*), legumes and vines, as well as for gardens and kitchen-gardens (450-497 ha). Our calculations will be incomplete if we ignore the state land and sacred land (Plat. *Leg.* 5.738; Arist. *Pol.* 1267b; 1330a), which usually, keeping in mind the remark of Thukydides (3.50.2), are estimated at 1/10 to 1/5 of all lands.¹⁶ Finally, the territories for pasture and haying should also be taken into consideration. Taking into account the quantity of cattle required for ploughing and dairy products as well as the number of sheep one should add at least a third again to the whole area of land. Unsatisfactory lands in the late-19th-century Evpatorija Districts comprised on average 5.6% of the whole territory. Thus, all these calculations give a total of 7,941 to 8,764 hectares for the whole *chora* of Kerkititis, i.e. 5-6 times more than I presumed before.¹⁷ In the case of a less productive two-field system the territory of the *polis* must have been even larger. The above estimations are summarized in Table 1.

The above calculations are based on the minimal needs of a *polis* with an estimated minimum population living within the city-walls. In fact, at the height of its flourishing, Kerkititis like other small *poleis* of the northern Black Sea coast may have possessed a number of rural, but eventually fortified sites, which so far have not been discovered. In this case, the figures we have arrived at will increase.

Table 1. *Estimated distribution of lands in Kerkinitis.*

	Area (ha)	% of tillage	% of total area
Arable lands	5,050-5,519	100.0	63.0
including:	2,700-2,980	54.0	34.0
land planted in wheat	1,350-1,490	27.0	17.0
land planted in barley	450-497	9.0	5.7
secondary cultures	550-552	10.0	6.3
Pastures	2,496-2,755	–	31.4
Unsatisfactory lands	445-490	–	5.6
Total area	7,991-8,764		100

According to the same method of calculation, in the beginning of the 5th century BC and at the turn of the 5th and 4th centuries BC the *polis* of Kerkinitis, the population of which at that time can be estimated at 1,200-1,400 and 1,600-1,800, would have possessed a territory of 4,765-5,577 and 6,353-7,171 hectares respectively. The estimated size of the rural territory of Kerkinitis in the middle of the 4th century BC is comparable with the Chersonesean *chora* on the Herakleian and Tarchankut Peninsulas, each part of which occupies an area of c. 100 km².¹⁸

Kerkinitis is mentioned in the Athenian Tribute List of 425/424 BC where its tribute quota is set at 3,000 drachmas.¹⁹ To make such a payment possible, one had to sell on the Athenian market only 600 *medimnoi* (or 23.5 tonnes) of wheat at 5 drachmas per *medimnos* (cf. Dem. 34.39). This price includes the payment of a c. 22.5-30.0% interest on a loan (Dem. 35.10-11) and a similar percentage for the merchant's profit. Therefore, the actual price of wheat on the northern coast of the Black Sea could hardly have exceeded 3.0-3.3 drachmas per *medimnos*. Hence, the payment of the above-mentioned *phoros* would cost the city c. 35-39 tonnes of wheat or one tenth of the average amount intended for export yearly in the 4th century BC. This implies that in the most favourable years the *polis* could effortlessly pay tribute to the Delian League. After all amendments to the above calculations, regarding the fifth-century period, one should admit that such a *phoros* was a feasible duty even for a small *polis*. Our calculations confirm the restoration of the tribute quota which has survived on the stone: [X]XX. If, however, the missing letter indicates one talent ([T]XX), the total amount of tribute would be raised to 8,000 drachmas. To afford this, the city would need to sell 95 tonnes of grain, which would make up about a quarter of the whole wheat export. This would certainly be an onerous duty for the city like Kerkinitis.

Discussing the natural geographical borders of the Kerkinitian *chora*, one should note that approximately one third of the calculated area would occupy the 7 km-wide stripe of land between Bogaj Bay on the Sasyk-Sivaš Lake and the Mojnak Lake. The Donuzlav Lake serves as a natural north-western border for the *polis*'s territory. Joining the sea at a distance of 40 km from the

Quarantine Cape (the site of Kerkititis), it stretches very far inland. Towards the south-east the *chora* could occupy the 25 km-long coast line including the Lakes of Sasyk-Sivaš, Saki and Kizil-Jar, from which a continuous coastal cliff intersected by the valleys of the main Crimean rivers begins.²⁰ Taking into consideration the fact that the territory between the aforementioned lakes could be covered by oak-groves or dense forests, the *chora* of Kerkititis might also have stretched in the opposite direction. In this case, the rural territory of the *polis* must be associated with archaeological sites datable to the period prior to the final quarter of the 4th century BC when this region was colonized by Chersonesos.

Notes

- 1 The main ideas of this paper were discussed in the following publications by the author: Kutajsov 1999, 83-93; 2001, 134-144; 2002, 291-307; 2003, 92-106; 2004, 13-45.
- 2 Dzens-Litovskij 1935, 78; 1936, 50, 54; Šnitnikov 1957, 284; 1969, 113; Chotinskij 1977, 151, 165; Rauner 1981, tab. 1; Podgorodeckij 1975, 9.
- 3 Januševič, 1976, 78-79, 89-90, 93-95; 1986, 45-50; Janushevich 1978, 14-15; Januševič & Kuz'minova 1989, 45, 49.
- 4 Kutajsov 2004, 18.
- 5 Januševič 1986, 68; Yanuchevitch, Nikolayenko & Kuzminova 1985, 115-122.
- 6 Kutajsov 2003, 94, fig. 2.
- 7 Kolesnikov 1998, 125-142.
- 8 Kutajsov 2002, 92-106; 2004, 24-26.
- 9 *For a very helpful discussion of this issue, see Isager & Skydsgaard 1992, 108-114 (Eds.).*
- 10 Janushevich 1975, 27; 1984, 270; 1986, 54.
- 11 Cf. now Stolba 2005, 307-311.
- 12 Kutajsov 2002, 291-300; 2004, 31-33.
- 13 Kutajsov 1990, 139.
- 14 Kutajsov 2001, 135.
- 15 Kutajsov 2001, 134-144; 2004, 36.
- 16 Andreev 1983, 268; Zubar' 1993, 17.
- 17 Kutajsov 1990, 150.
- 18 Chtcheglov 1992, 253-254, 258; Vinogradov & Ščeglov 1990, 319-320, 330; Nikolaenko 2001, 3.
- 19 Meritt, Wade-Gery & McGregor 1939, A-9.iv.165. *For an alternative reconstruction of this fragment, see Avram 1995, 195-198 (Eds.)*
- 20 Cf. Lancov 1991, 9; 1994, 92-93.

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Abbreviations

- ChSbor* Chersonesskij Sbornik. Sevastopol'.
- CPCPapers* Papers from the Copenhagen Polis Centre.

