Agriculture was a basic activity of the Balkan inhabitants even before these territories were occupied and became part of the Roman Empire. However, the new Roman reign brought new organisation methods, more or less successfully including the local population, which again depended on the Romanisation level of the newly established Roman provinces.

Due to the lack of historic data, the role of the autochthonous elements can only be assumed, but not completely determined. At the same time, the organisation of agricultural estates remains insufficiently defined, since the data given by Roman agronomists is mostly related to other parts of the Roman Empire. For example, in Apennine Peninsula, due to different socio-economic relationships, but also due to the climate and other natural circumstances, the organisation of agriculture must have been different from that in the Balkan provinces. As a result of this, archaeological finds, primarily agricultural tools, remain the best indicator of the agricultural activities in this area during Roman times.

According to their context, the agricultural tools excavated at the fortifications along the Danubian limes can mostly be dated into the Late Roman era. One can presume that the same, or very similar, types were used during the Principate, since these items belong to a group that rarely changes. In addition, the methods of agriculture remained somewhat unchanged during the entire Roman period. Much later, during the Middle Ages and through the entire 19th century, Serbian farmers used wooden ploughs, sickles and scythes, similar to those from the Roman period.

Scarcce data from Roman authors reveals that the greatest part of Upper Moesia was covered with woods, including the area of the Danubian

1 The article results from the project: Viminacium, Roman city and military camp – research of the material and non material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018), funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

2 The most data about Roman agriculture can be found in works of Roman agronomists: Cato et Varro, De agricultura; Plinius, Naturalis historia; Columella, De re rustica.
limes. Priscus writes about thick woods to the north of Niš (Priscus, Frg. 8, p.291, 23-26). The forest was thick and impenetrable from the Danube at Branicevo to Trajan table. This appearance was retained for a long time. It could assume that the Byzantine Empire in the Middle Ages, better protected from the enemy by the impassability of roads than the troops. In a much later period, in 19th century travel writers spoke about thick oak forests in the territory of today’s Serbia (Opra 1998: 169-170). It was well justified that the natural features of Serbia remained unchanged since the Roman times. Extensive changes of the natural surroundings occurred later, with the greater influences of the industrial revolution reaching our territory somewhat later than Western Europe.

A very important process in agricultural development is clearing forests and obtaining cultivable soil. Although there is no data preserved regarding organised clearing of great forest areas, it is certain that, during Antiquity, these activities took place on a large scale, especially in those areas suitable for farming. As a consequence of this, in areas of Roman provinces in the territory of modern Serbia, and along the Danubian limes, a great number of tools have been discovered, which were used for clearing, mostly forest vegetation, in order to obtain cultivable soil (I. Popović 1988).

In fortifications, mostly of the Late Roman times, tools used for tilling soil were discovered in large quantities, indicating the changes that took place in this period, related to supplying troops. Most of the agricultural tools coming from military camps represent single finds, although hoards were also discovered, like those from the castra of Boljetin or Saldum. Among the finds of Roman tools, special attention will be paid to those intended for ploughing and sowing grain.

### Ploughshare

At the sites along the Danubian limes in Upper Moesia, there were numerous ploughshare finds, representing parts of ploughs (Fig. 1). According to the typology by I. Popović, they are divided into several types and variants (I. Popović 1988: 98-104). The majority belong to symmetrical forms, while a single non-symmetrical example comes from the castrum of Karataš (Diana). The symmetrical ploughshare type was discovered in layers or hoards and is mostly dated into Late antiquity, actually the second half of the 4th century. The find of a non-symmetrical example reveals that during Late antiquity, beside ploughshares, also contemporary ploughing devices, ploughs, were used.

**Type Aa** is a symmetrical ploughshare with a triangular blade and a very sharp point, spear-shaped, discovered on the following sites:

- **Karataš (Diana)**
  - Excavation in 1983, C/923
  - End of the 4th and the beginning of the 5th century
  - Length: 32 cm.
  - Bibliography: I. Popović, Античко оруђе, type XXIII Aa, 100, cat. 1.

- **Kostol (Pontes)**
  - Excavation in 1982, C/212
  - 4th century
  - Length: 34.5 cm.
  - Bibliography: I. Popović, Античко оруђе, type XXIII Aa, 101, cat. 2.

- **Saldum**
  - Excavation in 1968, field inv. 266
  - Tool hoard, 4th century
  - Length: 40 cm.
  - Bibliography: I. Popović, Античко оруђе, type XXIII Aa, 101, cat. 3; G. Jeremić, Saldum, 164, cat. 484.
Fig. 1 Different types of ploughshares and coulter from the sites at the Danubian limes: 1, 6. ploughshares Karataš/Diana; 2-3. ploughshares, Boljetin/Smorna (tool hoard); 4. ploughshare Kostol/Pontes; 5. ploughshare, Dražaj near Grocka (tool hoard); 7. coulter Boljetin/Smorna.
**Boljetin (Smorna)**
Excavation in 1965, field inv. 81
4th century
Length: 31 cm.
Bibliography: И. Поповић, Античко оруђе, type XXIII Aa, 101, cat. 4.

**Boljetin (Smorna)**
Excavation in 1968, field inv. 864
Tool hoard discovered in an amphora, 4th century
Length: 42 cm.
Bibliography: Лj. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type XXIII Aa, 101, cat. 5.

**Boljetin (Smorna)**
Excavation in 1966, field inv. 405
4th century
Length: 28 cm.
Bibliography: Лj. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type XXIII Ab, 101, cat. 2.

**Boljetin (Smorna)**
Excavation in 1967, field inv. 760
Tool hoard, 4th century
Length: 28 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type XXIII Ab, 101, cat. 4.

**Type Ab** is a ploughshare with a triangular blade and a rounded point:

**Boljetin (Smorna)**
Excavation in 1968, field inv. 864
Tool hoard discovered in an amphora, 4th century
Length: 35 cm.
Bibliography: Лj. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type XXIII Aa, 101, cat. 6.

**Kostol (Pontes)**
Excavation in 1932, C/271
4th to 6th century
Length: 15.5 cm.
Bibliography: И. Поповић, Античко оруђе, type XXIII B, 102, cat. 2.

**Type B** possesses a symmetrical ploughshare with a triangular blade, with a more or less rounded point. On the Danubian limes, only two examples have been discovered so far:

**Saldum**
Excavation in 1968, field inv. 226
Tool hoard, 4th century
Length: 20.5 cm
Bibliography: И. Поповић, Античко оруђе, type XXIII B, 102, cat. 3; G. Jeremić, Saldvm, 164, cat. 486.

**Type E** is the last variant of symmetrical ploughshares from the Danubian limes fortifications. Such a ploughshare is arrow-shaped, with a triangular blade:

**Type Ad** has a trapezoid shaped blade with rounded angles:

**Kostol (Pontes)**
Excavation in 1983, C/158
4th century
Length: 35.5 cm.
Bibliography: И. Поповић, Античко оруђе, type XXIII Ad, 102, cat. 1.
Ravna (Campsa)
Excavation in 1966, field inv. 96
4th century
Length: 73 cm.
Bibliography: Њ. Поповић, Античко оруђе, type XXIII Е, 103, cat. 1.

Saldum
Excavation in 1969, field inv. 559
4th century
Length: 64 cm.
Bibliography: Њ. Поповић, Античко оруђе, type XXIII Е, 103, cat. 2; G. Jeremić, Saldum, 164, cat. 487.

Kostol (Pontes)
Excavation in 1980, C/102
4th to 6th century
Length: 25 cm.
Bibliography: Њ. Поповић, Античко оруђе, type XXIII Е, 103, cat. 3.

Type C, according to typology by I. Popović, is described as a non-symmetrical ploughshare with a long, opened socket with a rectangular cross-section and a deltoid shaped blade. The only example was discovered at the site Karataš.

Karataš (Diana)
Excavation in 1981, C/384
4th century
Length: 26 cm.
Bibliography: Њ. Поповић, Античко оруђе, type XXIII С, 102, cat. 1.

The ploughshare types found at the Danubian limes fortifications were also discovered in the neighbouring territories of the Morava valley, Pannonia, Bulgaria, Hungary and Romania (Popović 1988: 103-104). We can say that the types named above represent typical features of the entire Balkans throughout the Roman era.

Coulter
A coulter is a heavy blade in the shape of a knife, fixed upon a joist, cutting vertically in front of the ploughshare, thus making ploughing easier. The majority of Roman coulters possessed a flat, dull side and were fixed onto the ploughshare joist. In the 3rd and 4th centuries, coulters were introduced with a loop on the dull side, used for fixing chains that were again used for fixing the coulters onto joists. According to the typology given by I. Popović, it is possible to distinguish two types of such a tool (I. Popović 1988: 104-106). On the Danubian limes in Upper Moesia, both types were discovered in a hoard from Boljetin, dating from the 3rd to the middle of the 5th century.

Type A possesses a massive handle with a rectangular cross-section and a big flat or slightly bent, triangular blade. The dull side is flat, without a perforation or a loop used for fastening. Both types of this tool come from the castrum of Boljetin.

Boljetin (Smorna)
Excavation in 1967, field inv. 771
4th century
Length: 60 cm.
Bibliography: Њ. Поповић, Античко оруђе, type XXIV А, 105, cat. 1.

Boljetin (Smorna)
Excavation in 1967, field inv. 760
Tool hoard, 4th century
Length: 76.5 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; Њ. Поповић, Античко оруђе, type XXIV А, 105, cat. 2.

Boljetin (Smorna)
Excavation in 1967, field inv. 760
Tool hoard, 4th century
Length: 57 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; Њ. Поповић, Античко оруђе, type XXIV А, 105, cat. 3.
Type B is a coulter which possesses a massive handle with a rectangular cross-section and a big, flat, triangular blade. On its dull side, at the point where the handle becomes the blade, there is a perforation or a loop, used for fastening.

Boljetin (*Smorna*)
Excavation in 1967, field inv. 76
Tool hoard, 4th century
Length: 67.5 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type XXIV B, 106, cat. 4.

**Cleaner hoe**
A cleaner hoe is a small shovel used for cleaning ploughshares. It consists of an oval or fan-shaped blade. From Late Antiquity, there is a single find from the site of Kostol (*Pontes*). According to the typology by I. Popović, this find possesses features of type A, with an oval blade (Поповић 1988, 108). So far, this is the only find from the limes in Upper Moesia.

Kostol (*Pontes*)
Excavation in 1983, С/172
4th century
Length: 11 cm.
Bibliography: И. Поповић, Античко оруђе, type XXVI A, 108, cat. 3.

**Hoe**
Throughout the entire Roman era, the hoe was a tool with a wide range of uses in agriculture. Apart from being used in gardens and vegetable gardens, this tool was used for cultivating grain. The lighter hoe type was used during grain and vegetable growth, in order to remove weeds and prevent soil from cracking. Light hoes were also used for digging up, manuring and covering seeds with soil. The basic type has not changed from Antiquity to modern times.

In the Danube valley, hoe finds are numerous. According to I. Popović, it is possible to distinguish several basic hoe types, with sub-variants within each type (Поповић 1988: 39-44). Depending on the structure of the tilled soil, there are types with triangular, trapezoid or fan-shaped blades.

Hoe type *Aa* was discovered at several sites from the Danubian limes: in Čezava (*Novae*), Saldum and Karataš (*Diana*). This hoe type possesses a trapezoid shaped blade, with a round socket (Fig. 2).

Saldum
Excavation in 1968, field inv. 270
Tool hoard, 4th century
Length: 24 cm.

Čezava (*Novae*)
Excavation in 1968, Т/1119
4th century
Length: 15.6 cm.

Boljetin (*Smorna*)
Tool hoard, 4th century
Length: 11 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Ab, 40, cat. 1.

Variant *Ab* is distinguished by a trapezoid blade with rounded corners. Such examples were discovered within a tool hoard from the Boljetin *castrum*.
Boljetin (Smorna)
Tool hoard, 4th century
Length: 29 cm.
Bibliography: Љ. Зотовић, СтаринарXXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Ab, 41, cat. 3.

Čezava (Novae)
Excavation in 1968, T/1282
4th century
Length: 19.5 cm.
Bibliography: И. Поповић, Античко оруђе, type IV Ba, 41, cat. 2.

Boljetin (Smorna)
Tool hoard, 4th century
Length: 20.5 cm.
Bibliography: Љ. Зотовић, СтаринарXXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Ab, 41, cat. 6.

Kostol (Pontes)
Excavation in 1980, C/14
4th century
Length: 20.5 cm.
Bibliography: И. Поповић, Античко оруђе, type IV Ba, 41, cat. 3.

Boljetin (Smorna)
Excavation in 1967, inv. nr. 539
Tool hoard, 4th century
Length: 21 cm.
Bibliography: Љ. Зотовић, СтаринарXXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Ba, 41, cat. 7.

From the Danube limes fortifications, there are isolated hoe finds, but also those from hoards. According to the typology by I. Popović, they can be classified as hoe type B. Such hoes possess a trapezoid shaped blade, with huge shoulders and a rounded lower blade part. The socket is massive with a hammer-shaped ending.

Variant Ba of this hoe type is characterised with an approximately equal blade length and width. Such a type was discovered at the sites of Čezava (Novae), Kostol (Pontes) and Boljetin (Smorna).
### Table 1 The agricultural tools from the Roman sites on the Danubian limes in Upper Moesia.

<table>
<thead>
<tr>
<th>Agricultural tools</th>
<th>Type/variant</th>
<th>Number of tools</th>
<th>Dating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site ČEZAVA/NOVAE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hoe</td>
<td>IV A/a</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/a</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td><strong>Site SALDUM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/a</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII B</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII E</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII C</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV A/a</td>
<td>2</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/b</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td><strong>Site BOLJETIN/SMORNA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/a</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/b</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td>coulter</td>
<td>XXIV A</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>coulter</td>
<td>XXIV B</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>hoe</td>
<td>IV Ab</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/a</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/b</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/c</td>
<td>3</td>
<td>IV century</td>
</tr>
<tr>
<td><strong>Site RAVNA/CAMPSA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII E</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/b</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td><strong>Site KARATAŠ/DIANA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/a</td>
<td>1</td>
<td>IV-VI century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV Bc</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td><strong>Site KOSTOL/PONTES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/a</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII A/d</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII B</td>
<td>1</td>
<td>IV-VI century</td>
</tr>
<tr>
<td>ploughshare</td>
<td>XXIII E</td>
<td>1</td>
<td>IV-VI century</td>
</tr>
<tr>
<td>cleaner hoe</td>
<td>XXVI A</td>
<td>1</td>
<td>IV century</td>
</tr>
<tr>
<td>hoe</td>
<td>IV B/a</td>
<td>1</td>
<td>IV century</td>
</tr>
</tbody>
</table>
Boljetin (Smorna)
Excavation in 1966, inv. nr. 261
4th century
Length: 26 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Ba, 41, cat. 8.

Variant Bb of this type possesses a blade in the shape of a long triangle with a rounded top. It was also discovered in several fortifications along the limes:

Ravna (Campsa)
Excavation in 1968, field inv. 65
4th century
Length: 20 cm.
Bibliography: И. Поповић, Античко оруђе, type IV Bb, 103, cat. 2.

Saldum
Excavation in 1968, field inv. 269
Tool hoard, 4th century
Length: 26 cm.
Bibliography: И. Поповић, Античко оруђе, type IV Bb, 42, cat. 4; G. Jeremić, Saldum, 165, cat. 490.

Boljetin (Smorna)
Excavation in 1966, inv. nr. 261
4th century
Length: 25 cm.
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Bb, 42, cat. 5.

The third variant of this hoe type possesses a short blade, with an approximately equal length and width.

Karataš (Diana)
Excavation in 1982, C/589
4th century
Length: 14 cm.

Bibliography: И. Поповић, Античко оруђе, type IV Bc, 42, cat. 4.

Boljetin (Smorna)
Tool hoard, 4th century
Length: 11 cm
Bibliography: Љ. Зотовић, Старинар XXXIII-XXXIV, 221; И. Поповић, Античко оруђе, type IV Bc, 42, cat. 7.

The obtained statistics reveal that along the Danubian limes in Upper Moesia, among Roman soldiers, agriculture played an important role (Table 1). The development and improvement of tools used for cultivating grain, which can be established after analyses of archaeological material, influenced the intensity of agricultural production and increased quantities. At the same time, this indicates the importance of the Danubian limes in the production of grain as the basic food intended for the military stationed in numerous castella along the Danube.

According to inscriptions, it can be concluded that the military administration possessed specific territory, separated from that of a municipal nature. An inscription from the time of Alexander Severus gives testimony that, in 228, in Viminacium, such a military territory (teritorium legionis) was arranged (В. Поповић, 1968: 42). This kind of land ownership played an important role in supplying the army (Zaninović 1985: 63).

Nevertheless, it is not known who owned the land and where the borders of the public land (ager publicus) were, separating it from the legionary owned land (teritorium legionis). During the entire Early Imperial Age, outside these properties, there were certainly important rural communities of autochthonous populations, also practicing farming. This is indicated by a sacrificial altar from Ratiaria, dedicated to the god of herds and pastures, Pali sancto pastorali (Mirković 1968: 138).

While considering Late Roman fortresses along the Danubian limes and the question of
agricultural producers, one should bear in mind that during this period, apart from major changes in the social life and social status of farmers, there was also a change in the military organisation, which was again reflected in land ownership. From the 4th century onwards, military units along the border, *limitanei*, living within military camps, were given land that was used as pastures (*paludes*) (Jones 1973: 629). In 365, according to the law of Valens, for nine months, *limitanei* were paid in kind, while for three months, they were paid with money. In 406, according to the law of Arcadius, they were fully paid with money (Jones 1973: 630).

The nature of Roman border troops, *milites limitanei*, during Late Antiquity, is still partly unknown. In 363, for the first time, the name *limitanei* is mentioned (CTh. XII, I, 56), claiming that these represented troops stationed along the borders of the Empire. According to B. Isaac, one cannot claim that the limitani were just ordinary rural militia, consisting of farmer-soldiers, as was explained in earlier theories, still accepted by many scholars. According to him, these were territorial military units under the command of a *dux limitis*, whose main role was to control and protect the bordering area of the Empire (Isaak 1988: 146).

The earliest source describing *limitanei* that till their own land comes from the first half of the 5th century. The law from 423 prohibited anyone, apart from the owner, from tilling land in the vicinity of *castellani milites* (Jones 1973: 653). The law from 443 prohibited the leasing of land to newcomers, since only the limitanei (*milites limitanei*), who were previously excused from paying taxes, were allowed to till it (Jones 1973: 654). In such a way, at the beginning of the 5th century, a social layer of land owners was created – the border soldiers – *limitanei*. Their agricultural activities are attested not only with finds of agricultural tools from the Late Roman layers of the fortifications along the Danubian limes, but also with finds of granaries. In the 1980s, during archaeological research at the military camp in Kostol (*Pontes*), a large number of oval pits containing burned grain were discovered within the Late Roman layer. Such pits were unearthed in the area of the former *principia*, already abandoned at this time.

Regarding remains of rural settlements with wooden houses, discovered near the military camps along the Danubian limes and dating from the end of the 3rd century to the time of Valentinian I (Petrović, Vasić 1996: 22), as well as other small finds discovered within some of the Late Roman fortresses (Gabričević 1986: 71-91, figs. 23-24) one can speak about the existence of civilian settlements near the military fortifications along the limes in the 4th and at the beginning of the 5th century (Vujović 2012: 29-43). It cannot be said with great certainty whether these were settlements of the families of the *limitanei* or whether rural civilian settlements were established in the vicinity of military camps, in order to supply the neighbouring troops.

---

3 Information was obtained from Dr. Sofija Petković, senior research fellow of Archaeological Institute from Belgrade, to whom I express my gratitude.

4 This topic was partly addressed by M. Vujović, in his paper about Late Roman helmets from the Danubian limes: M. Vujović, New Contributions on the Late Roman Helmets from Iron Gate, Весник Војног музеја у Београду 39, 2012: 29-43.
BIBLIOGRAPHY

Ancient Sources


Priscus, Frg. 8, p. 291, 23-26, after: Византијски извори за историју народа Југославије I, (ур.) Г. Острогорски, Београд: САН.

Contemporary literature

Gabričević, M. 1986

Isaak, B. 1988
The Meaning of the Terms Limes and Limitanei in Ancient Sources, JRS LXXVIII: 125-147.

Jeremić, G. 2009.
Salūm: Roman and Early Byzantine Fortification, Belgrade: Institute of archaeology.

Jones, A. H. M. 1973

Mirković, M. 1968
Rimski gradovi na Dunavu u Gornjoj Meziji, Beograd: Arheološko društvo Jugoslavije.

Опра, Љ. 1998
Девет храстова: записи о историји српске метеорологије, Београд: Реп. хидрометеоролошки завод Србије, Музеј науке и технике САНУ.

Petrović, P. and Vasić, M. 1996

Поповић, И. 1988
Античко оруђе од звожћа у Србији, Београд: Народни музеј.

Поповић, В. 1968

Vujović, M. 2012
New Contributions on the Late Roman Helmets from Iron Gate, Весник Војног музеја у Београду 39: 29-43.

Zaninović, M. 1985
Prata legionis u Kosovu kraj Knina s osvrtom na teritorij Tilurija, Opuscula Archaeologica 10: 63-79.

Зотовић, Љ. 1984
Бољетин (Smorpa), римски и рановизантијски логор, Старинар XXXIII-XXXIV: 211-225.
REZIME
NALAZI RIMSKOG
POLJOPRIVREDNOG ORUĐA
NA DUNAVSKOM LIMESU
U GORNJOJ MEZIJI KAO
POKAZATELJ RAZVOJA
ZEMLJORDNJE NA TERITORIJI
VOJNIH LOGORA

KLJUČNE REČI: POLJOPRIVREDNO ORUĐE,
UTVĐENJA NA DUNAVSKOM LIMESU,
GORNJA MEZIJA, KASNOANTIČKI PERIOD.

Oruđe korišćeno prilikom obrade poljoprivrednog zemljišta registrovano je u znatnom broju u utvrdnjima uglavnom kasnoantičkog limesa, što ukazuje na promene koje su u ovom periodu nastale u načinu snabdevanja vojske. Većina poljoprivrednog oruđa koje potiče iz vojnih logora predstavlja pojedinačne nalaze, mada su registrovane i ostave poljoprivrednog oruđa poput one iz kastruma Boljetin ili Saldum. U radu smo se posebno osmrnuli na oruđe korišćeno za oranje zemljine i pripremu za sadnju žitarica: različiti tipovi raonika, crtala, otika i motika.

Analizom dostupnog materijala možemo da zaključimo da je na Dunavskom limesu u Gornjoj Meziji poljoprivreda igrala značajnu ulogu. Razvoj i usavršavanje oruđa namenjenog kultivaciji žitarica uticali su, svakako, na intenzitet poljoprivredne proizvodnje i povećanje prinosa. Isto tako, to govori i o značaju koji je oblast Dunavskog limesa imala u proizvodnji žitarica kao osnovne životne namirnice namenjene vojnicima stacioniranim u brojnim kastelima na Dunavu.