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PRILEP, NORTH MACEDONIA
House taskscapes in the Early Neolithic of the Pelagonia Valley: micro-refuse analyses

First results of the Campaign 2019
Head Office of the German Archaeological Institute
by Ferran Antolín, Vesna Dimitrijević, Goce Naumov, Amalia Sabanov and Raül Soteras

e-FORSCHUNGSBERICHTE DES DAI **2021** · Faszikel 2

Im Sommer 2019 wurden an archäologischen Fundplätzen im Pelagonia-Tal (Nordmazedonien) neue Forschungsarbeiten durchgeführt, die die systematische Sammlung von Sedimentproben, ihre Behandlung mit der Halbflotationsmethode, die Gewinnung von Mikroresten und ihre anschließende Analyse umfassen. Drei frühneolithische (ca. 6000–5800 v. Chr.) Fundstellen werden untersucht und verglichen, wobei der Schwerpunkt auf archäobotanischem Material, aber auch auf anderen ökologischen und paläoökonomischen Beweisen liegt. In diesem Beitrag werden die angewandte Methodik und die ersten Ergebnisse einer Reihe von Proben (deren Analysen 2021 abgeschlossen wurden) aus der Kampagne 2019 am Standort Vrbjanska Čuka vorgestellt. Ziel ist es, das Potenzial der Mikrorestanalyse von Proben aus Hauskontexten aufzuzeigen.

New research, which involves the systematic collection of sediment samples, their treatment with the wash-over method, extraction of micro-refuse, and their subsequent analysis, started being implemented at archaeological sites

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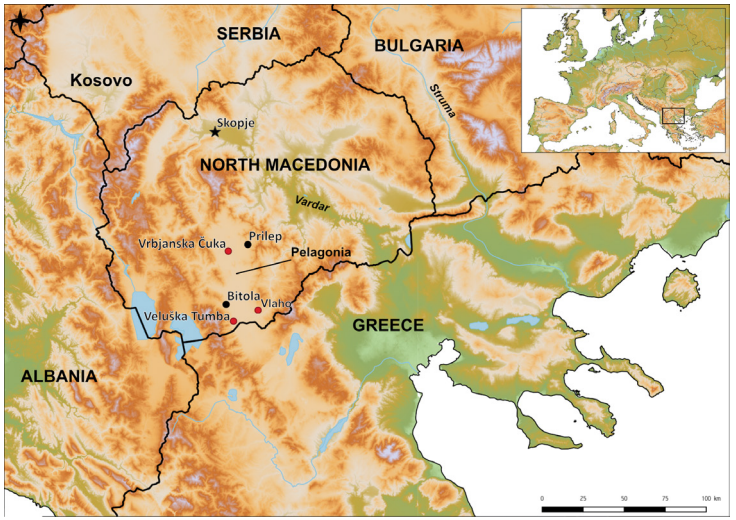
Head of project: F. Antolín, G. Naumov.

in the Pelagonia Valley (North Macedonia) in the summer of 2019. Three Early Neolithic (ca. 6000–5800 cal BC) sites are being investigated and compared, with a focus on archaeobotanical materials, but also on other environmental and palaeoeconomic evidence. This paper presents the methodology applied and the first results from a series of samples (those for which the analyses were completed in 2021) from the 2019 campaign at the site of Vrbjanska Čuka. The goal is to illustrate the potential of micro-refuse analysis of samples coming from house contexts.

1 The study of the evolution of productive and reproductive strategies – in Marxist terminology – at a household scale can explain general processes of socioeconomic change [1]. Tell-site archaeology has proven to yield high-quality information in this regard [2]. This project focuses on the Pelagonia Valley, 150 km away from the Greek Thessalian Plain, one of the first focus areas of neolithisation in continental Europe.

2 The Pelagonia basin is a large karst polje of 60 x 10–15 km [3], currently consisting of a large and fertile plain of ca. 2000 km^2 at around 650 m above sea level (asl). It is filled by alluvial deposits, brought by the river Crna Reka and its tributaries [4]. The climate is continental and considerably wet (ca. 900 mm of annual precipitation). This territory might have been uninhabited or thinly inhabited during the Mesolithic [5], and it could have been an optimal route northward, possibly in a second wave of Neolithisation, since current dates set the onset of farming around 6000 BC in the area [6].

3 Different types of settlements have been defined for the Neolithic in North Macedonia ↗: tell sites, flat sites in the lowlands, hill sites, and pile-dwellings [7]. This is quite a unique diversity that implies different relationships with the environment. The most common settlements of early farmers consist of houses of mudbrick or wattle and daub, usually of 4 to 10 m length. Multiple superimposed houses are found, often with plastered floors and *in situ* preserved ovens and grinding equipment. The fact that some of the constructions in tell sites seem to be intentionally burnt has raised the attention of many scholars, who discuss the social meaning behind it [8].



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1 Sites being investigated (red dots) by the German Archaeological Institute in collaboration with the University of Basel, the University of Belgrade and the Center for Prehistoric Research in North Macedonia. (Map: adapted by Ferran Antolín from Antolín et al. 2020)

2 Sieving work being performed at the Museum of Prilep (Prilep, Macedonia) during Summer 2019. (Foto: Ferran Antolín)

Evidence for farming is recognized and gathered by archaeobotanical, archaeozoological and sickle tool investigations performed at early Neolithic sites in the area [9].

4 The study of activities which took place inside the houses has brought new insights into the narrative of the Neolithic [10]. A reliable indoor activity reconstruction at the sites of our study area has not been possible with the applied field methods to date [11]. In this project, we attempt to overcome this void by undertaking micro-refuse analysis [12], namely, the study of small anthropogenic remains found in sediment samples which are normally sieved for archaeobiological analyses. Despite regular cleaning of house floors and the apparent lack of artefacts in the excavated deposits, small-sized remains often remained trapped in them. These remains give information about waste behaviour, which is of great importance for the assessment of structured deposits in archaeology [13]. Micro-refuse analysis could provide a completely new insight following an innovative integrated micro-contextual approach. This methodology will be applied at three early Neolithic sites in the Pelagonia Valley: Vrbjanska Čuka, Veluška Tumba and Vlaho (Fig. 1). This report, nevertheless, only concerns a few samples from Vrbjanska Čuka, which were studied in 2021 in an interdisciplinary fashion, as an example of the potential for this kind of analysis at a first evaluation stage.

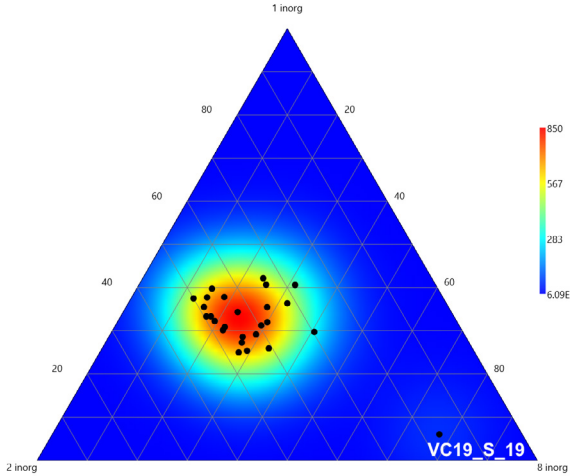
Sample treatment and analysis

5 The volume of sediment was measured in a dry state prior to sieving with calibrated buckets or jugs, depending on the volume of the sample (often ca. 10 litres of sediment). This information is essential to allow comparisons between samples of different volumes (in such case, the density of remains per litre of sieved sediment can be the unit of comparison). Before sieving, all the samples were soaked, and four were frozen and then thawed to make the earth clumps disintegrate without breaking them mechanically [14] which could crumble the charred remains. For treating the samples, the wash-over method [15] was used (Fig. 2). This technique requires gentle disintegration of the soil in a plastic bowl with water, which then lets the charred

organic components be separated by flotation. The charred contents are poured over a column of sieves with different mesh sizes which separates them. These later make up the organic (light) fraction of 2 mm and 0,35 mm. The same procedure is repeated until the remaining sediment in the bowl is devoid of all the charred material and only the mineral components remain. This makes up the inorganic (heavy) fraction and is divided into 8 mm, 2 mm, and 1 mm fractions. The sieving station of IPAS (University of Basel) was transported to the site for this purpose.

6 The sieved fractions are dried and their volume is measured. This can later be used to observe differences between the samples in terms of the amount of mineral or organic remains or to compare the volume of the different fractions. For the analysis of the heavy fraction of the larger samples subsampling was needed. It was conducted by using the grid system [16] where the whole fraction is spread equally on a surface and then divided into squares of the same size. Afterwards, the same amount is taken from each square in order to have a random subsample. For the 2 mm fraction 30 to 40 ml were taken, and 5 to 8 ml for the 1 mm. The daub remains in the subsample were divided from natural inorganic components and then its volume was measured. The rest of the sample was screened for the remaining plant macroremains, bone and shell fragments and artefacts. All the bone, shell, and plant remains as well as artifacts of various materials are separated and counted. For large light fractions, the same type of subsampling can be conducted. In rich samples ca. 4 to 5 ml of the 0.35 mm fraction were enough to reach >100 seed/fruit remains. Smaller light fractions are completely sorted.

7 The following elements were quantified during our analyses (NR= number of remains; ml.: volume; sq: semiquantified): Mammal (NR); Mammal, charred/calcined (NR); Bird (NR); Bird, charred/calcined (NR); Fish (NR); Fish, charred/calcined (NR); Shell (NR); Microvertebrata (NR); Microvertebrata charred/calcined (NR); Tools/manuport (NR); Seed/Fruit (NR); Mineralized seed (NR); Chaff (NR); Straw (NR); Tuber (NR); Charcoal (NR); Other organic remains (NR); Organic concretion (NR); Daub (ml.); Daub with spikelet impression (NR); Daub with flat side (NR); Round mineral concretion (NR);



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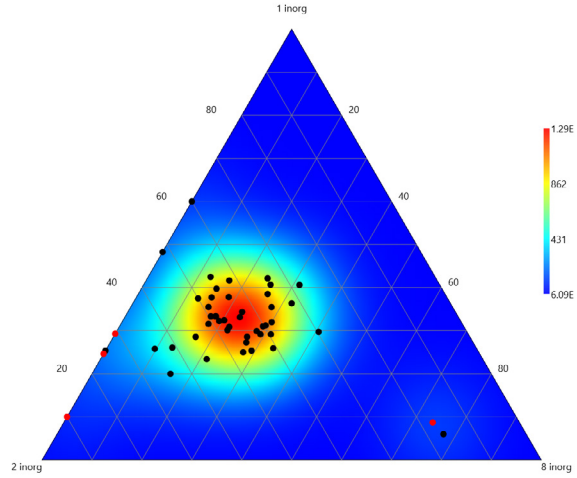

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3 Proportions between the volume of 1 mm, 2 mm and 8 mm fractions for the samples analysed in this paper with indication of an outlier. (Diagram: Ferran Antolín)

4 Proportions between the volume of 1 mm, 2 mm and 8 mm fractions for all the samples of the 2019 campaign at Vrbjanska Čuka. Red dots correspond to samples obtained from oven/near oven contexts. (Diagram: Ferran Antolín)

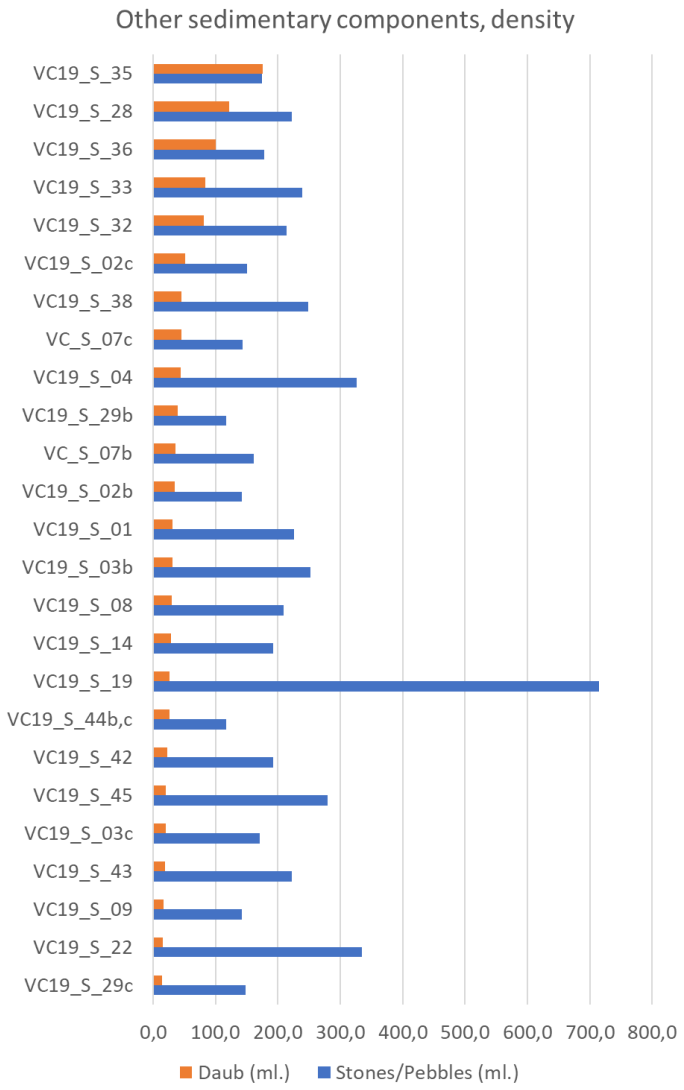
Stone/Pebble (NR); Stone/Pebble (ml.); Pebble/Sand (ml.); Heavy mineral (NR); Other stones (NR); Quartz flake (NR); Flint flake (NR); Pottery (NR); Modern big roots (sq); Modern roots (sq). The data was inserted into a database in Excel.

First results of the campaign 2019

8 A summary of results is presented in Figures 3 to 8. From a sedimentological point of view, the heavy fraction of the average bulk sample shows ca. 35 % of small sized (1–2 mm), 45 % of medium-sized (2–8 mm), and 20 % of large-sized (>8 mm) components. One sample (VC19_S_19) does not follow this pattern and presents a very high proportion of large-sized elements (Fig. 3). When observing the most important sedimentary components (Fig. 5), this sample presented the largest concentration of pebbles/stones, which suggests it originates from a particular context (possibly a cooking area?). We compared this sample to other non-fully-analysed samples from Vrbjanska Čuka (Fig. 4) and we observed that oven contexts were often outside of the general sedimentological pattern, perhaps supporting the statement that sample 19 probably corresponds with a cooking area.

9 Animal remains show certain diversity: they tend to appear in all samples (only three of them did not yield any finds) in a mean density between ten and 15 remains per litre of sediment, and only occasionally are they found in densities above 25 remains per litre (Fig. 6). The samples of medium densities may represent what is known as background noise, the typical samples for the site in question that do not necessarily help us characterize specific activity areas, but multifunctional or post-depositionally affected areas. They usually contain a mixture of bones of larger mammals and microvertebrates, as well as shell fragments.

10 Large mammal remains and possibly clams are related to food preparation and consumption, and/or cleaning of the living space. None of the samples contained only charred fragments of large mammal bones to indicate food preparation, i. e. cooking or roasting meat *in situ*. A large number of bone fragments were charred, with colours going from black to grey, and there were also several calcinated fragments. This would correlate with low



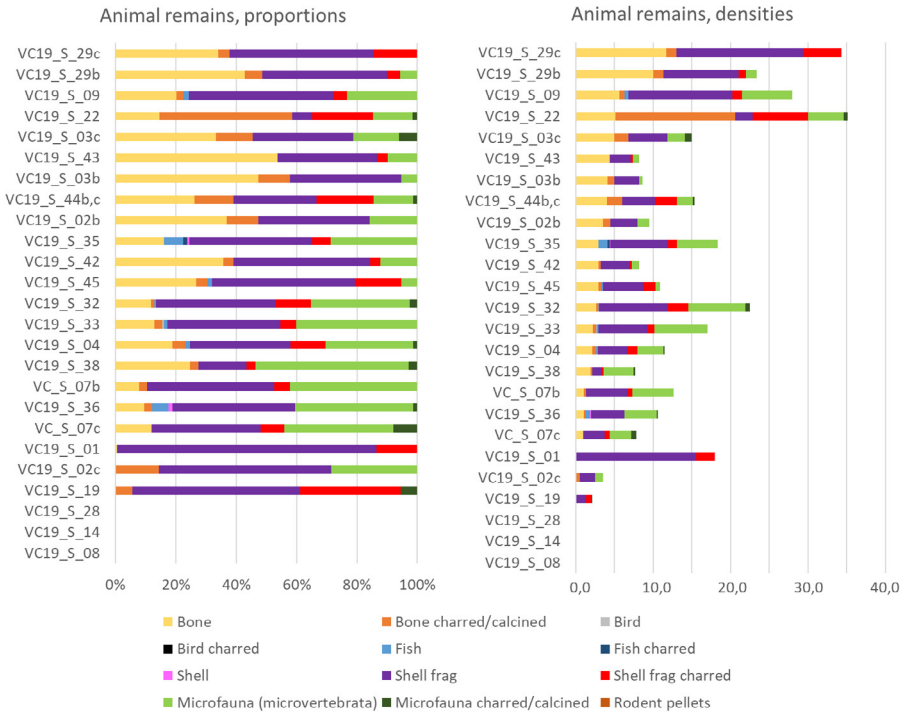
5 Density of daub and stone/pebbles per litre of sediment sieved. (Tab.: Ferran Antolín)

firing temperatures and/or short-lasting fires. Most of the samples contained a mixture of unburnt and charred fragments, so they probably accumulated as the consequence of cleaning of the living space. This is further supported by the fact that in most samples remains of several classes of vertebrates and molluscs are found as a mixture of burnt and unburnt specimens. Since it is not very likely that large mammals, fish, and clams were prepared for food together, they might represent refuse from various meals accumulated. Remains of birds are not necessarily related to food preparation, while fish remains likely entered the assemblage as food remains. Frogs, lizards, insectivores, rodents, and microgastropods supposedly have nothing to do with food preparation. Their presence might indicate the existence of storage facilities or natural fauna of the surroundings of the settlement. Their occurrence in the samples could indicate some mixing of material.

11 One sample stands out (VC19_S_35) due to the higher density of fish remains, and a second one (VC19_S_01) due to the dominance of shell remains. Among the samples showing higher density of remains, some follow the most common proportions, but sample VC19_S_29 shows a very low density of microvertebrates and seems to correspond with a pure consumption context. Sample S_22 also stands out due to the large amount of charred bones of large animals, shells, and microvertebrates.

12 The density of pottery and lithics is very low and we presume that the occurrence of pottery is not very informative (Fig. 7). Flint and quartz are rare and sometimes they appear in the same samples (i. e. VC19_S_35, S_32, S_01, S_08). It is remarkable that the sample (S_08) that presented higher densities in lithics did not yield any animal remains (knapping area?), while sample S_35 also showed a higher presence of fish remains and S_01 might be connected to the consumption of shells. In this sense it would be interesting to perform functional analyses of lithic tools found in these samples.

13 Archaeobotanical remains were classified in the first instance into seed/fruit, chaff (parts of the cereal ear that are not grain), and charcoal (Fig. 8). Their density is, in comparison to most dry sites, very high. Low densities for Vrbjanska are represented with around 10 remains/l (these probably reflect



6 Porportions and density of animal remains found in the analysed samples ordered from lower (bottom) to higher (top) densities of bone (uncharred) finds. (Tab.: Ferran Antolín)

the so-called background noise), medium densities around 50 r/l, and high densities beyond 100 r/l. There is a dominant group of samples presenting a similar pattern of ca. 25 % of seed/fruit remains, 60 % of chaff, and 15 % of charcoal. Since an important part of the seed/fruit remains are not cereal grains, these can be considered as chaff-rich samples, particularly sample VC19_S_45. Chaff remains are typical on-site finds because glume wheats are best stored in spikelets (namely, in the glumes) and processed for the removal of glumes on a daily basis. The resulting by-product (chaff) is used as fuel, as animal fodder, and as tempering material for daub and pottery [17]. Since this sample was poor in daub remains (Fig. 5), we can establish that this is a clear by-product of dehusking which was possibly used as fuel or discarded near a fire, and in that way, it could get charred without completely turning into ashes. The organic fraction of sample VC19_S_09 was seed-rich and it also presented large densities of bone remains in the inorganic fraction and hence maybe reflects accumulation of garbage. Other bone-/shell-rich samples did not yield high densities of plant finds, which could be an indicator of specialized activity areas.

14 This short report was aimed at demonstrating that stratigraphic units may be described at a much more detailed level by incorporating micro-residue analyses and thus, complementing their stratigraphic position, colour, and texture with their composition in order to yield a more informed interpretation of their taphonomy. This knowledge may be used to classify samples based on activity areas or taphonomic pathways that affect their composition – thus, improving the chances of more accurate debates with further studies that can be made with the analysis of the remaining artefacts and ecofacts. The next steps involve the incorporation of additional samples from the 2019 to 2021 campaigns with the spatial evaluation of the data and their contextual analysis according to the functionality associated to each stratigraphic unit and house context.

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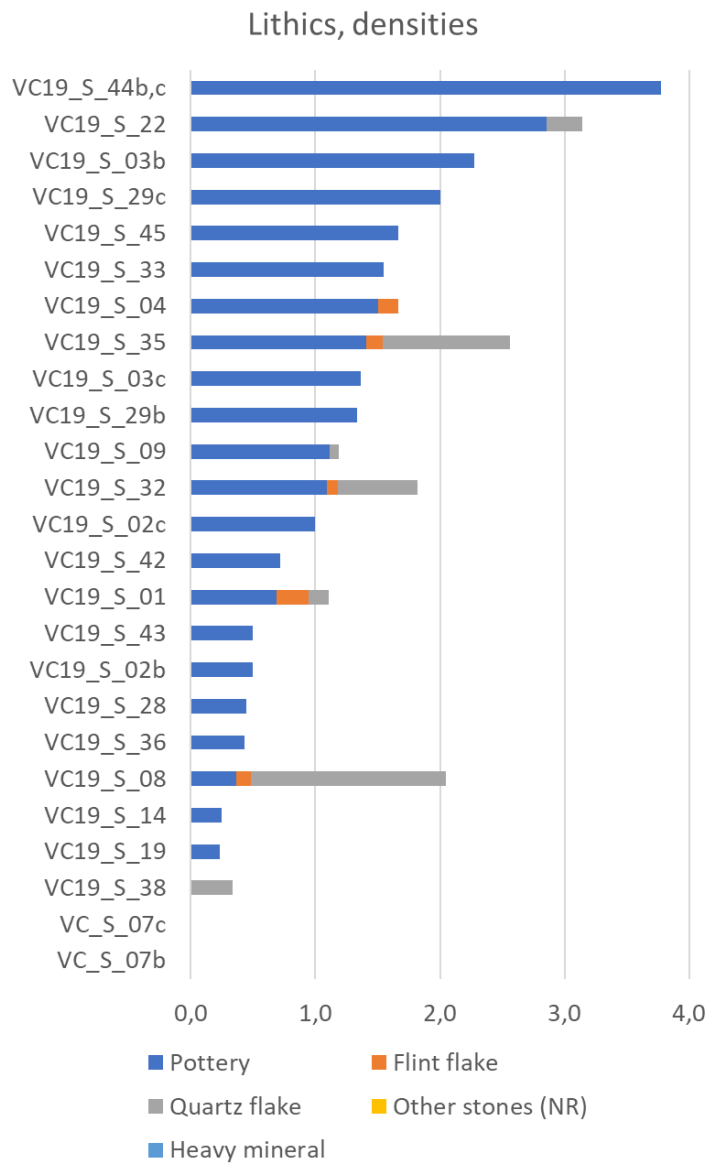
15 We are thankful for the funding provided by the University of Basel in the framework of the Lehrgrabung Vrbjanska Čuka.



7 Density of pottery, flint, and quartz tools found per sample ordered per density of pottery finds. (Tab.: Ferran Antolín)

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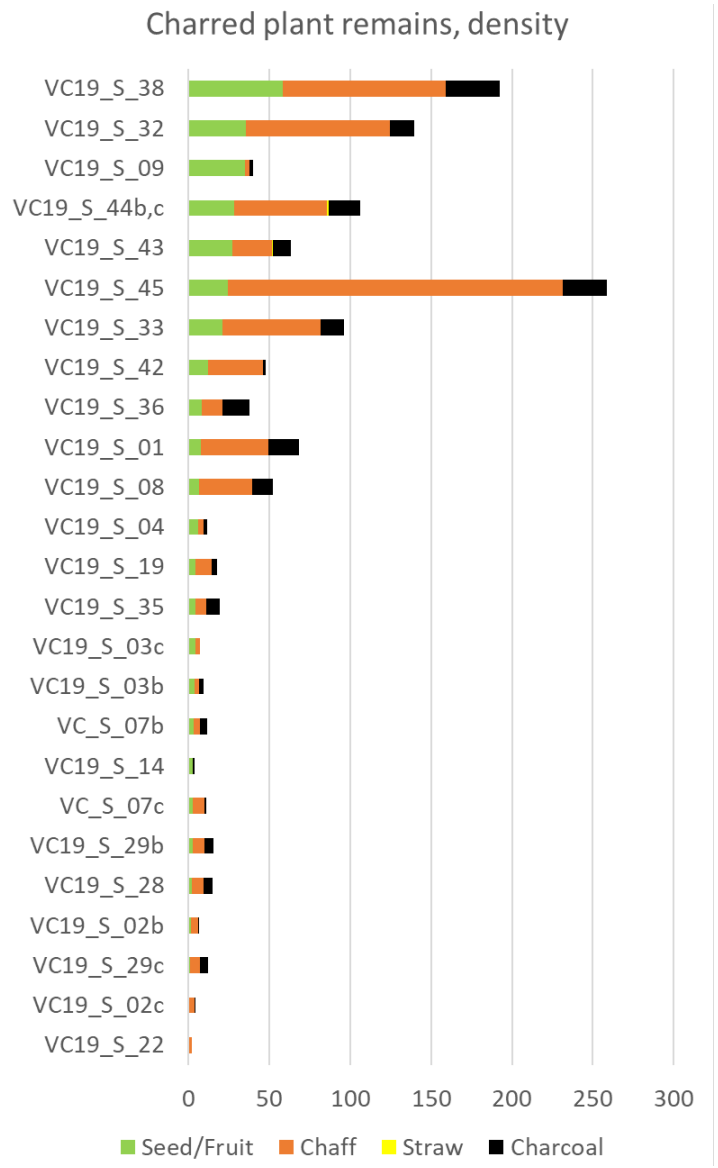

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[11] Fidanoski 2019.
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[15] Kenward et al. 1980.
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[17] See i. e. Naumov et al. 2021.

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