Peopling the Landscape of Çatalhöyük: Reports from the 2009–2017 Seasons

Edited by

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Supplementary material to Chapter 5. The Archaeobotany of Çatalhöyük

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Online Appendix S5.1. Unit-by-unit discussion

Here we append botanical accounts of particular Buildings/Spaces. These accounts are based on summary macrobotanical data derived from the priority assessment of PUP units (that is, the final set of priority units from the 2009–2017 excavations agreed across the project in preparation for final analysis and publication), plus full archaeobotanical analysis of selected units (PUP and other units). For the sake of simplicity the data are summarised into the following categories (with abbreviations used in graph legends in brackets): cereal grain (CERGR), cereal chaff (CHAFF), pulses (PULSE), sedge seeds (SEDGE), all other wild plant seeds (WEED/WILD), fruitstone and nutshell (FRUIT/NUT), sedge tuber (TUBER) and reed stem (REED).

North Area

Building 77

The archaeobotany of the burned phase (variously labelled B77.B and B.77.9) of B.77 (Spaces 336 and 337) is reported in volume 8 (Bogaard et al. 2013). Fig. S5.1 shows the distinctive spatial distribution of plant remains from this phase: a concentration of cereals (glume wheat spikelets) from storage/processing in the side room, and a 'food' deposit of peas mixed with other material (including fish bone) near the ladder entrance/chimney.

Fig. S5.2 shows the summarised data from units belonging to pre-burning phases (B77.1 through B77.6, post-2008 excavation) of B.77, Sp.336. The units that most closely relate to plant-related activity in Space 336 are the dirty floors. These are relatively rich in charred plant remains and strongly dominated by the chaff-rich residues of cereal processing, especially dehusking of glume (hulled) wheats (see fig. 5.1 in Bogaard et al. 2021; Bogaard et al. 2013). Dehusking of glume wheats stored in their chaff (in spikelet form – see burning phase deposit in Sp.337, fig. S5.1) represents a final processing step before cooking and consumption. This activity is widely linked with dirty floors in buildings across the site (Bogaard et al. 2013; Bogaard et al. 2021). A fire spot (22092) has a very similar composition.

Fig. S5.2 shows that other floor/fill samples tend to be more mixed in their composition and less abundant in charred plant remains generally. Relatively rich exceptions are units 21677 and 21682, both burial infills. In the absence of in situ burning in these burials, the material must be secondary/tertiary. These burial infills show that quite 'dirty' sediments rich in charred plant remains could be used as burial fills.

Overall, the assemblage from pre-burning B.77 is dominated by a mixture of food (cereal) processing and likely fuel residues (for example, sedge seeds often derived from animal dung fuel burned as fuel). The building's 'use' deposits attest to handling of multiple cereals (naked barley, bread wheat, emmer, 'new type' wheat) and pulses (lentil, pea).

Building 131

Figs S5.3–S5.5 show the summarised data from burning (B131.6) and pre-burning (mostly B131.4) occupation phases. The burning phase preserves three distinct primary deposits: 22656, a large concentration of wheat spikelets (paired grains enclosed in chaff) of the 'new type' glume wheat in Sp.556 (upper photo, fig. S5.3); 22637, a small concentration of the same kind of spikelets, near oven F.7953 in Sp.500 (lower photo, fig. S5.3); and 21195,s.4, a small concentration of peas and wild mustard seeds in Sp.504. Especially 22656 and 21195,s.4 are very rich in charred botanical items (fig. S5.4); 22656,s.2 contains nearly 60,000 items per litre sediment. These deposits are strongly reminiscent of those in the burning phase of neighbouring B.77, which also featured spikelets of the 'new type' glume wheat, a distinctive morphotype of wheat that replaced emmer wheat in the mid-late Neolithic levels (Bogaard et al. 2017; Bogaard et al. 2021).

The pre-burning occupation phases of B.131 are mostly represented by burial fills, but 32386 is a hearth fill (fig. S5.5). All show more mixed and/or chaff-rich composition than the burning phase and are low–moderate in density of charred items per litre sediment. 32386 only contains a few items. Food plants linked directly with Building 131 in 'use deposits' are therefore mainly the burning phase units, demonstrating storage/use of 'new type' glume wheat, pea and wild mustard seeds, plus trace amounts of naked barley, free-threshing wheat and emmer wheat.

Building 132

Fig. S5.6 shows the summarised data from various occupation phases (B132.1–B.132.7). Many of these units represent dirty floor deposits and occupation sediments. These include a gridded dirty floor (31540), enclosed by a red box in fig. S5.6. Most samples are dominated by chaff from glume wheat dehusking of stored spikelets (the storage of glume wheat grain as chaff-enclosed spikelets is well attested, for example, in later burned Buildings 77 and 131 in the North Area). Most are low–moderate in density of items per litre sediment. One unusual sample (31540,s.24) contains very few items and so cannot be considered representative of a distinct activity. Dehusking residues are widely represented in dirty floor deposits across the site and through the Neolithic sequence, reflecting indoor cereal processing prior to consumption, and the discard of this material in fire installations as fuel/kindling.

One unit stands out as by far the richest in plant remains (>40,000 in total) and the highest in density per litre sediment (>2000 items/litre): 32046,s.3, marked in fig. S5.6 with a large arrow. This unit is the fill of pit F.7740, and mostly contains the chaff by-product of glume wheat spikelet dehusking. This deposit was not burned in situ (?) but appears to represent a single kind of activity. If the dominant chaff component of this high-density deposit derives from a single cereal processing event, it would equate to processing of ca 10 kg of grain: the amount a small-scale family would consume in 1–2 weeks, assuming that it was a dietary staple.

Taxonomic identification (to species, where possible) of fully analysed samples from 'use' deposits (for example, dirty floors) from B.132 indicates that multiple cereals (naked barley, bread wheat and three glume wheats (einkorn, emmer, 'new type' glume wheat)) and pulses (bitter vetch, lentil, pea) are associated with occupation of this building. It is notable that the dominant glume wheat appears to be emmer, in contrast to the dominance of 'new type' glume wheat in later burned buildings, B.131 and B.77. The dominance of emmer over 'new type' glume wheat is generally an 'archaic' feature of the site's earlier levels; mid-sequence burned buildings notably exhibit storage of emmer or 'new type' glume wheat spikelets, while 'new type' is dominant in the later levels (Bogaard et al. 2017; Bogaard et al. 2021).

Remarkable continuity through the occupation of B.132 is the main chronological observation from fig. S5.6, but there are hints of higher pulse, fruit/nut and tuber proportions in some of the earlier samples. Samples from the early occupation phases (B132.1–3) were subjected to priority assessment only (not full analysis), and hence on quantification of small subsamples. The proportions of categories in these earlier samples, therefore, are liable to be less accurate than those in later samples. However, units of the very latest occupation phase (B132.7) also only received priority assessment, so there are hints of a genuine trend through time from relatively diverse food plant use to a more cereal-dominated pattern, though it is a slight/subtle tendency.

External Space 85-610-631

The Space 85-610-631 sequence, excavated on a 50x50 cm grid by Issavi et al. (Volume 15, Chapter 16), provides the most detailed evidence for activities in a Middle-Late Neolithic outdoor area. Fig. S5.7 summarises abundance and density data to chart use of this external space through time. The abundance of botanical and density per litre sediment suggest that the space tended to become 'cleaner' through time. Sp.85 is associated with consistently low abundance and density data, though the composition in terms of botanical categories is similar to earlier phases. We suggest that this trend charts the local transition from a 'true' midden area in North.G (Sp.631-610), where rubbish rich in charred plant remains accumulated, to a cleaner activity space or yard in North.?H (Sp.85).

South Area

Building 80

Figs S5.8–S5.9 summarise the composition of B.80 samples, ordered by occupation phase, mostly from Sp.135. Most of the samples are low–moderate in density of items per litre sediment, but several high-density samples come from the burning phase (B80.3) and contain hundreds to thousands of items. Two distinct 'storage' concentrations of charred crop material were preserved in the burning phase in Sp.135: units 18952 (mostly peas) and 18945 (naked barley). The remaining units from B80.3 are burned fills/dumps with a mixed residual signal from these concentrations.

The earlier occupation phases of B.80 (B80.2.2–2.7) derive from a range of context types, including hearth fills and dirty floors. These units contain varying mixtures of fuel, food and food processing (especially dehusking) residues. It is notable that the pre-burning phases contain a more diverse crop spectrum (naked barley, free-threshing wheat, emmer, 'new type' glume wheat) than that featured in the primary 'storage' deposits of the burning phase (pea and naked barley).

Building 79

Figs S5.10–S5.11 summarise the composition of samples from neighbouring Building 79. The burning phase of this building features a 'storage' concentration of rock rose seeds (*Helianthemum* sp.) on the floor of Sp.134. Previous evidence for collection of this taxon consisted of a small concentration in the Mellaart archive from a South level VI building but lacking further contextual detail (Fairbairn et al. 2007). The lower bar charts in figs S5.10–S5.11 downweighted *Helianthemum* (dividing its seed counts by 1,000) to clarify other components. The major cereal concentrations of the burning phase are spikelets of emmer wheat (see lower left photo of paired grains in fig. S5.10) and semi-clean free-threshing wheat grain, including charred grain clusters fused with bread wheat rachis material (see lower right photo in fig. S5.10).

Building 97

Figs S5.12–S5.13 summarise the archaeobotanical composition of samples from Building 97. Though these include primary burned deposits from the final phases (B97.B-A) – for example, unit 19238, interpreted under excavation as 'seed clusters' – none represent high-density concentrations comparable to those found in Buildings 79-80. Botanical remains are present at low to moderately high density; units containing less than ten botanical items were left out in figs S5.12–S5.13. The deposits from Building 97 represent typical mixtures of food, fuel and processing residues, including from a series of pre-burning phase 'use' deposits (dirty floors, hearth/oven fills, etc.). Crops represented in the burned fills and earlier 'use' deposits (and therefore linked to occupation of the building) include multiple cereals (naked barley, threshing wheat, emmer, 'new type' glume wheat) and pulses (lentil, pea). One of two burial fills (18666) contains a relatively high abundance of items, indicating once again that quite 'dirty' fills could be used for this purpose, as observed in other buildings.

Building 89

Fig. S5.14 summarises the archaeobotanical composition of Building 89's extended sequence of dirty floors and hearth fills (the major context types represented here). Botanical remains are present at low to moderately high density (up to ca 170 items/litre of sediment); units containing less than ten botanical items were left out of fig. S5.14. As in other buildings, 'use' deposits like dirty floors and hearth fills contain a varying mixture of small-scale food discard, processing and fuel residues, especially dehusking. This is remarkably consistent through the building's occupation sequence. Crops linked to the building's occupation through in situ burning (oven/hearth fills, dirty floors) include multiple cereals (naked barley, free-threshing wheat, einkorn, emmer, 'new type' glume wheat) and pulses (bitter vetch, chickpea, lentil, pea).

Building 160

Fig. S5.15 summarises the archaeobotanical composition of Building 160's assemblage. These deposits are low to moderately high in density (up to ca 100 identifiable items per litre of sediment). They represent the repeated mixture of small-scale food discard, processing and fuel residues, as in other buildings. There is evidence for use of multiple cereals (naked barley, bread wheat, emmer, 'new type' wheat) and pulses (bitter vetch, pea, lentil) through in situ burning (oven/hearth fills, dirty floors). The dominance of emmer over 'new type' glume wheat and diverse pulses fit within the early Neolithic sequence (Bogaard et al. 2017; Bogaard et al. 2021).

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Fairbairn, A., Martinoli, D., Butler, A., Hillman, G. 2007; 'Wild plant seed storage at Neolithic Çatalhöyük East, Turkey' *Vegetation History and Archaeobotany* 16.6: 467–79

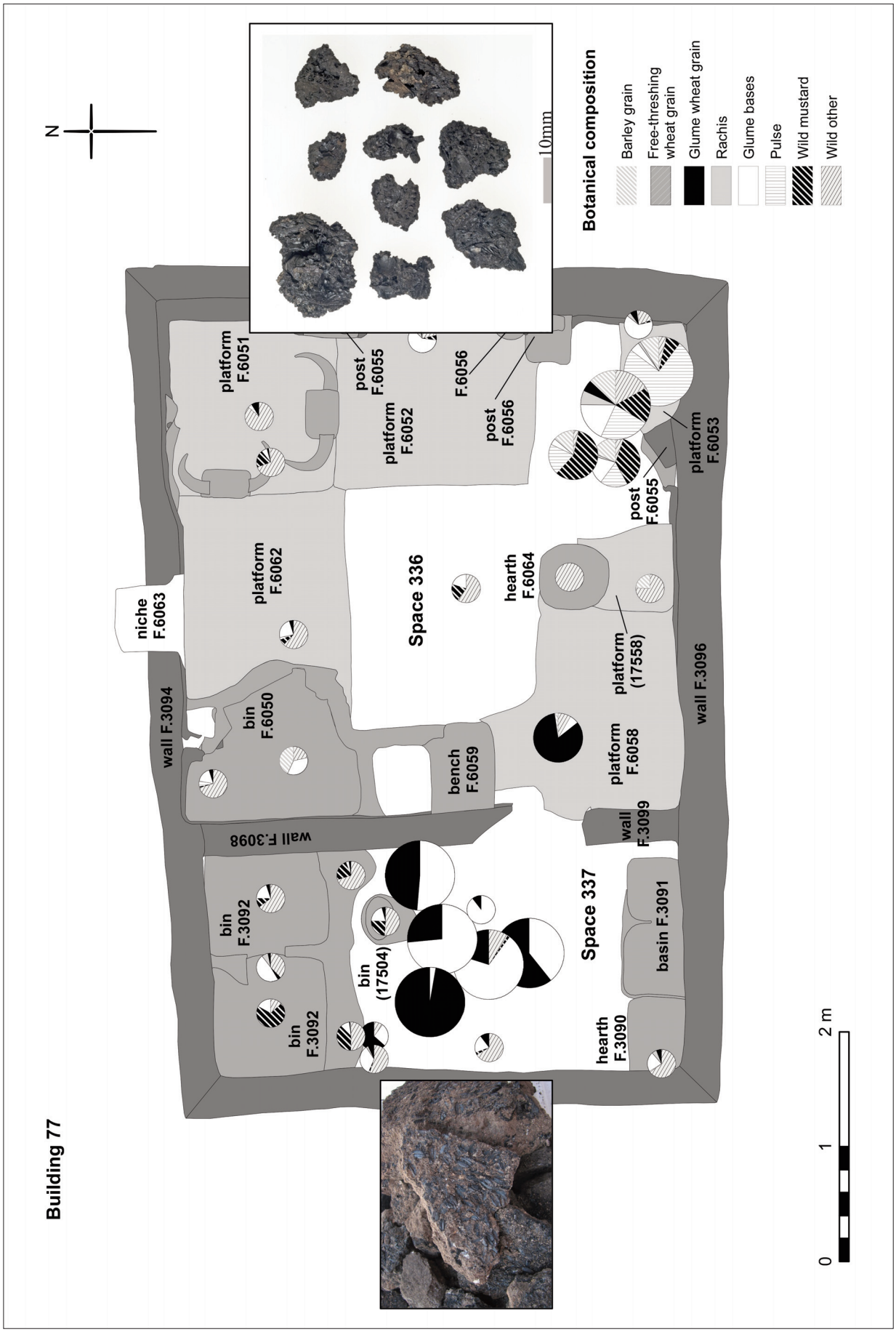


Figure S5.1. Building 77 (North G) – Burning phase.

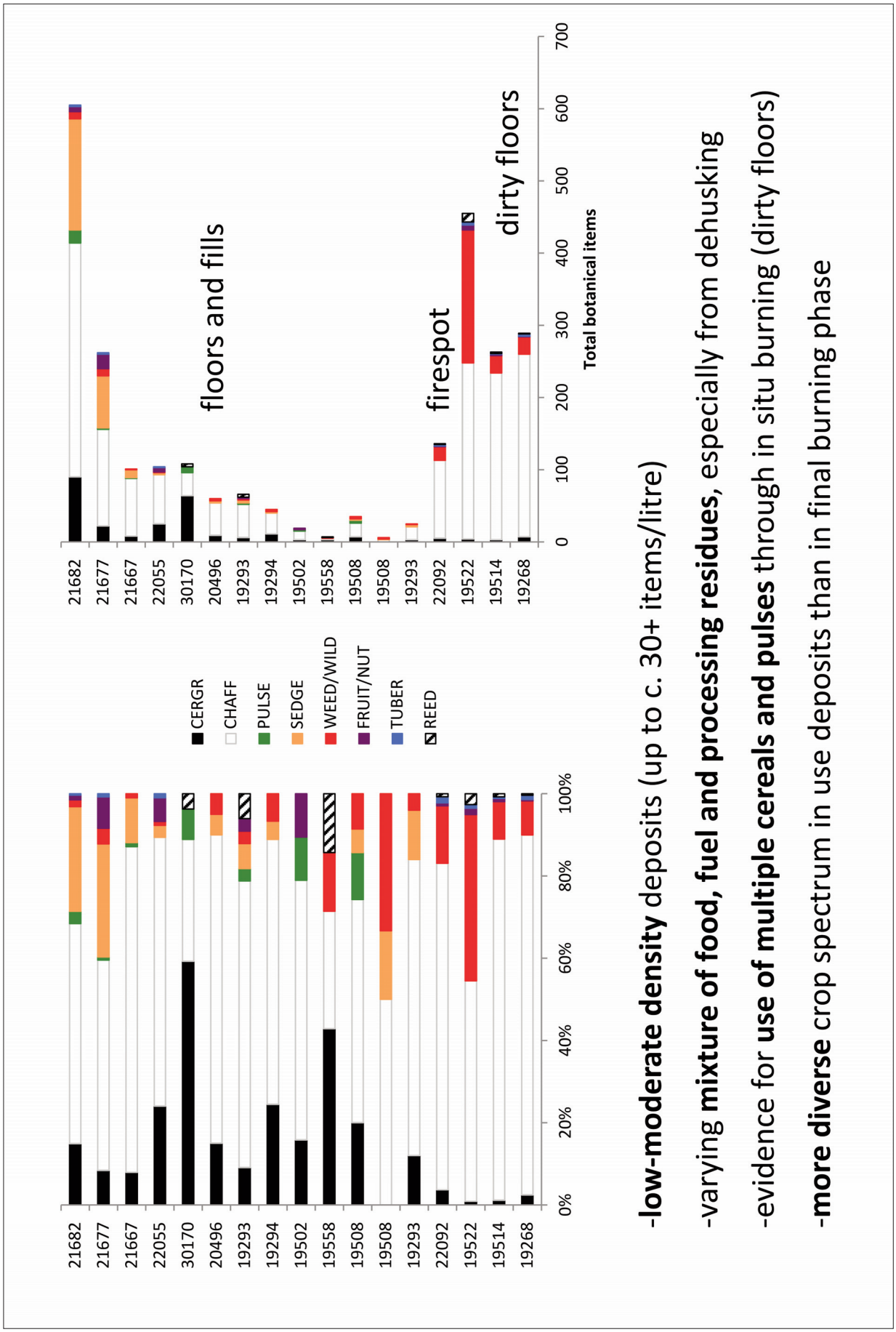


Figure S5.2. Building 77 (North G) – Archaeobotanical summary of pre-burning phases, Sp.336.

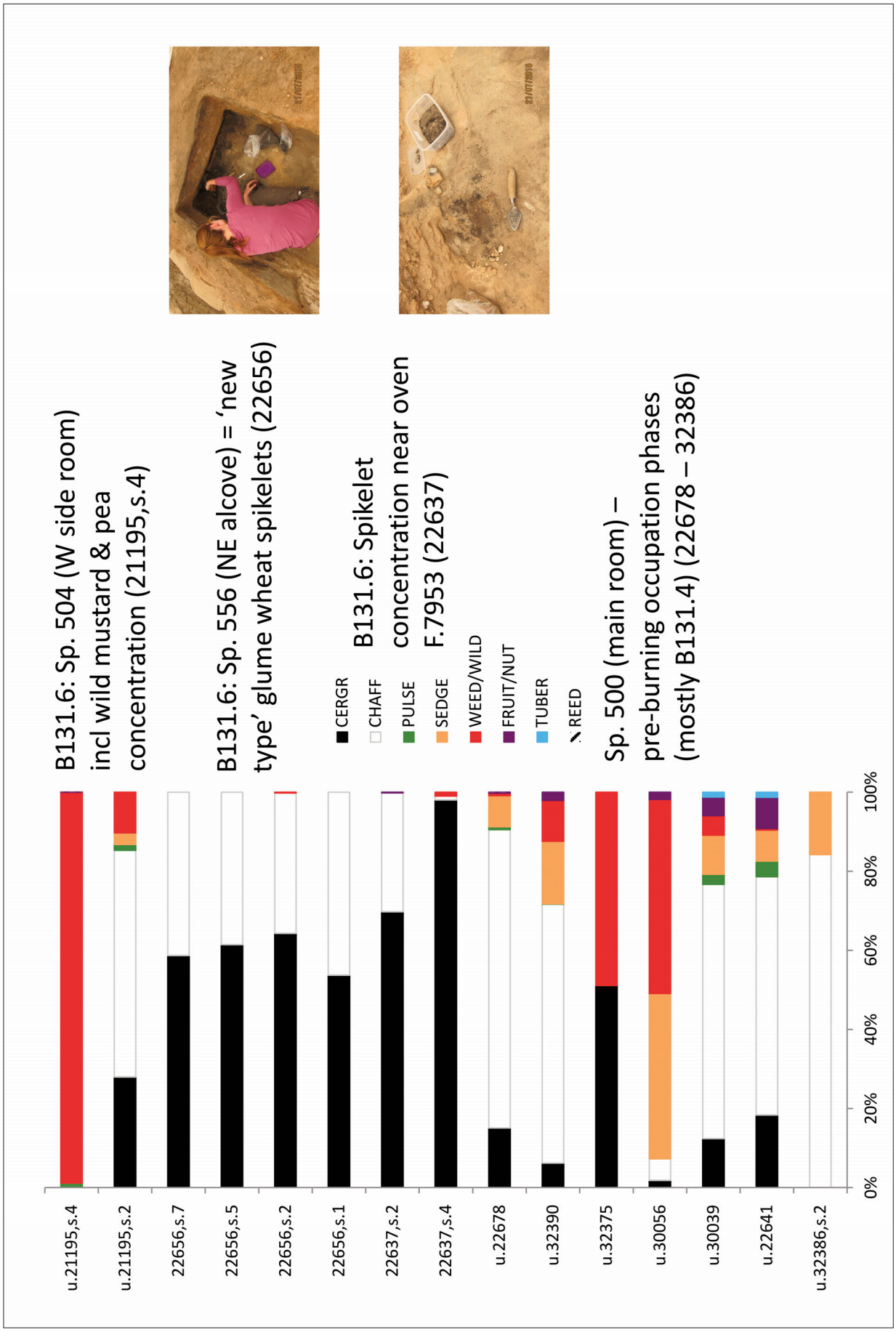


Figure S5.3. Building 131 (North G) – Archaeobotanical summary.

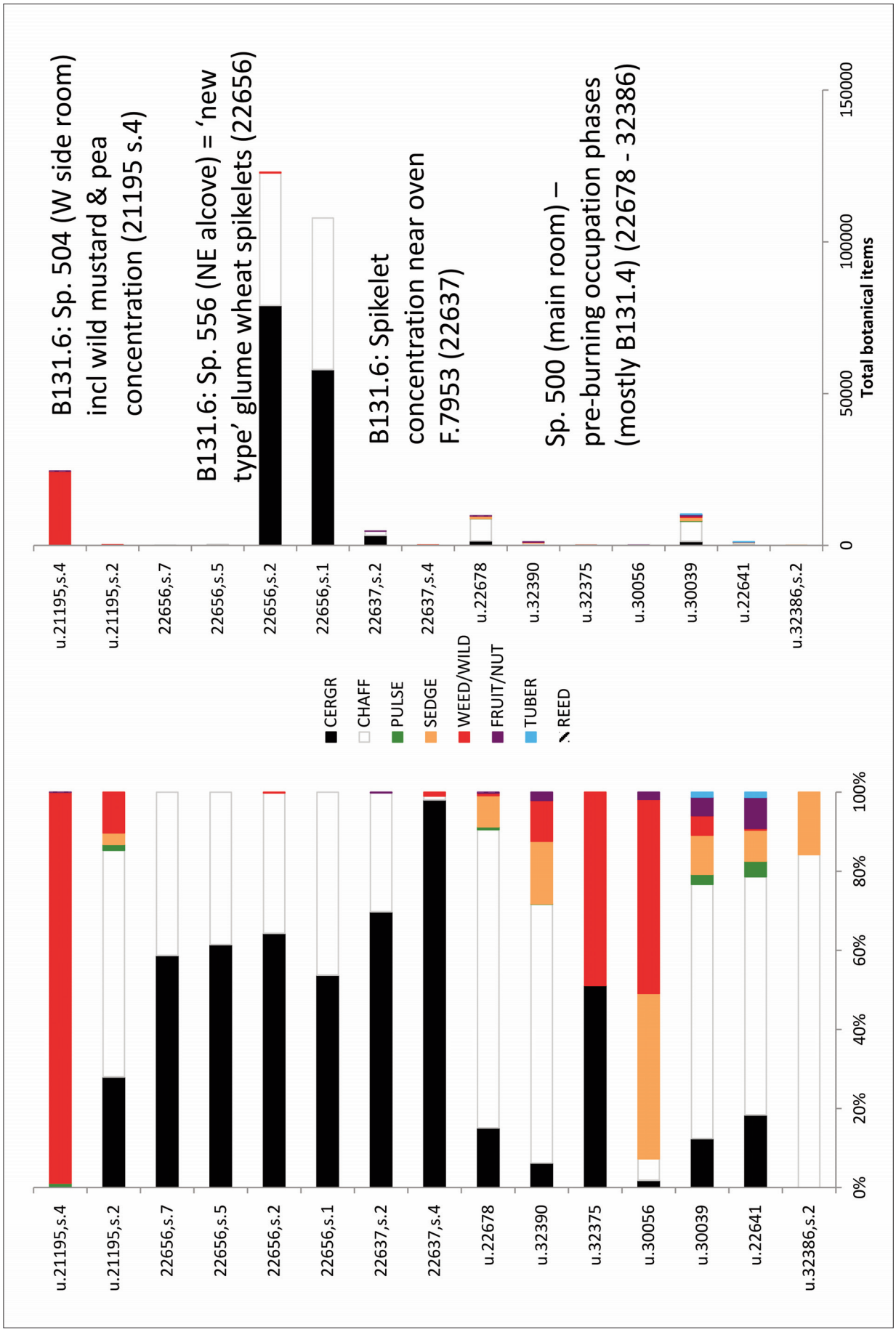
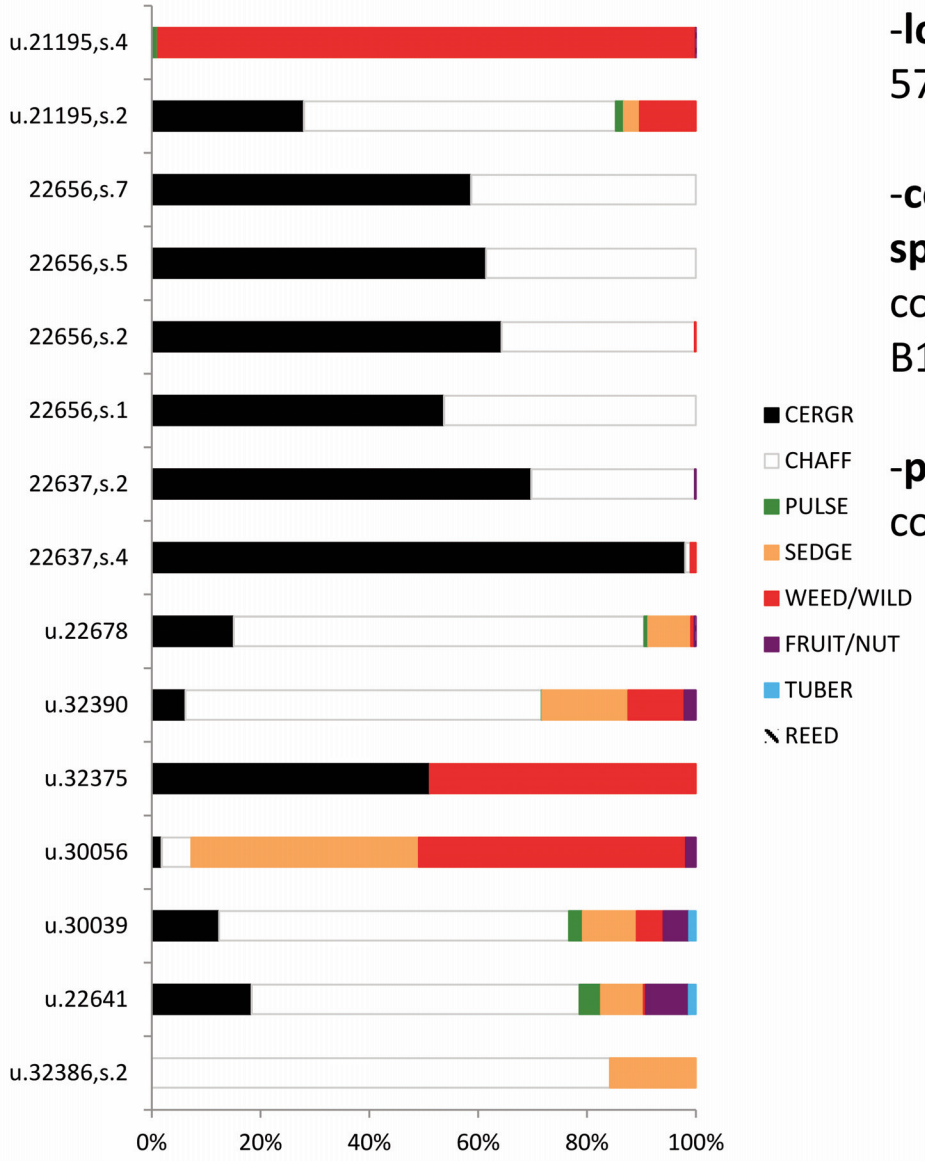


Figure S5.4. Building 131 (North G) – Archaeobotanical summary.



-**low** - **very high-density** deposits (up to c. 57,000 items/litre = 'pure' grain/chaff)

-**concentrations of 'new type' glume wheat spikelets** (not dehusked yet) plus a small concentration of **wild mustard** and **peas** in B131.6

-**pre-burning** use deposit (32386, hearth fill) contains very few items; rest are burials fills

Figure S5.5. Building 131 (North G) – Archaeobotanical summary.

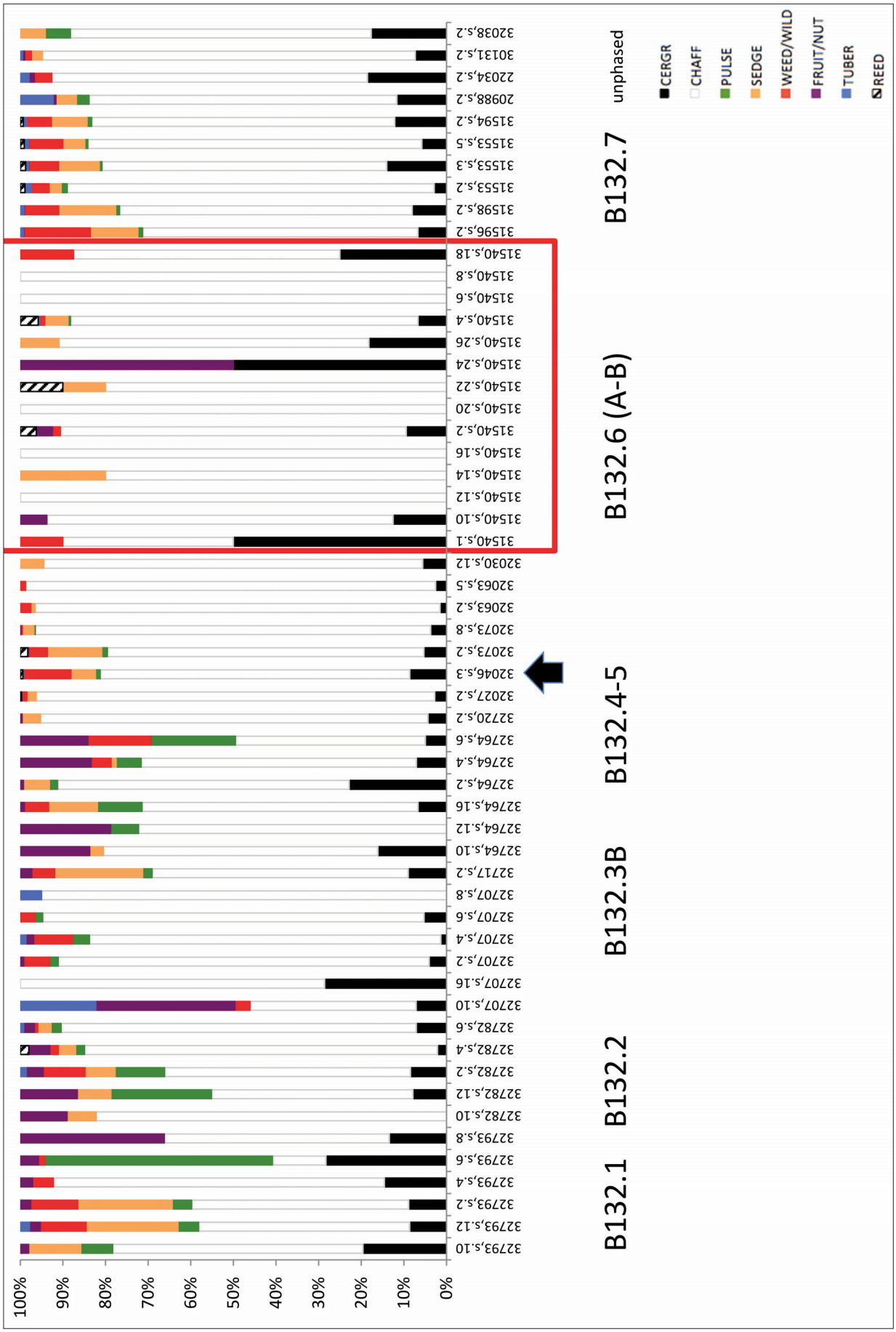


Figure S5.6. Building 132 (North F) – Archaeobotanical summary; the red box encloses samples from a gridded dirty floor (31540), while the arrow highlights a particularly high-density sample, 32046,s.3.

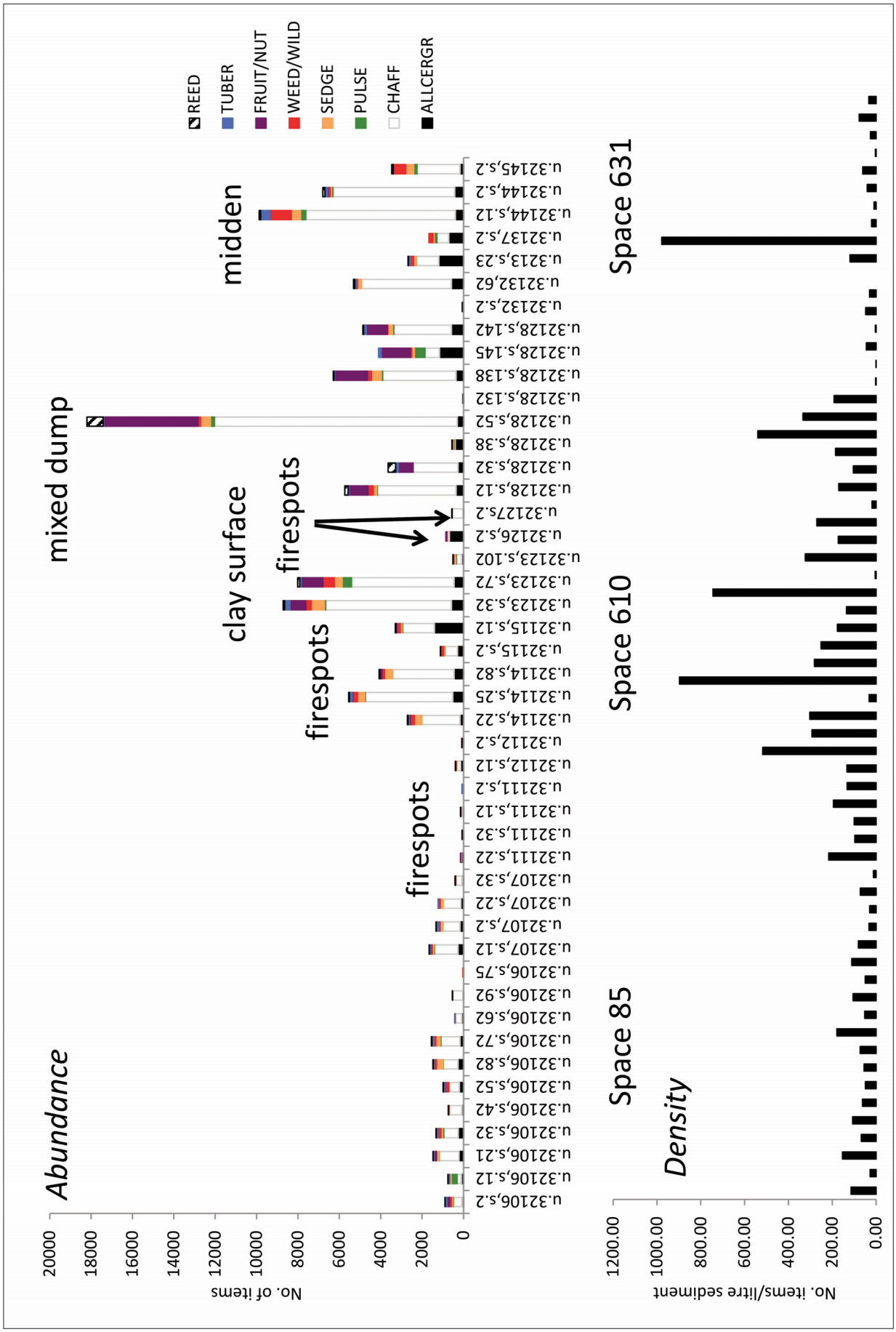


Figure S5.7. Sp.85-610-631 – Archaeobotanical summary.

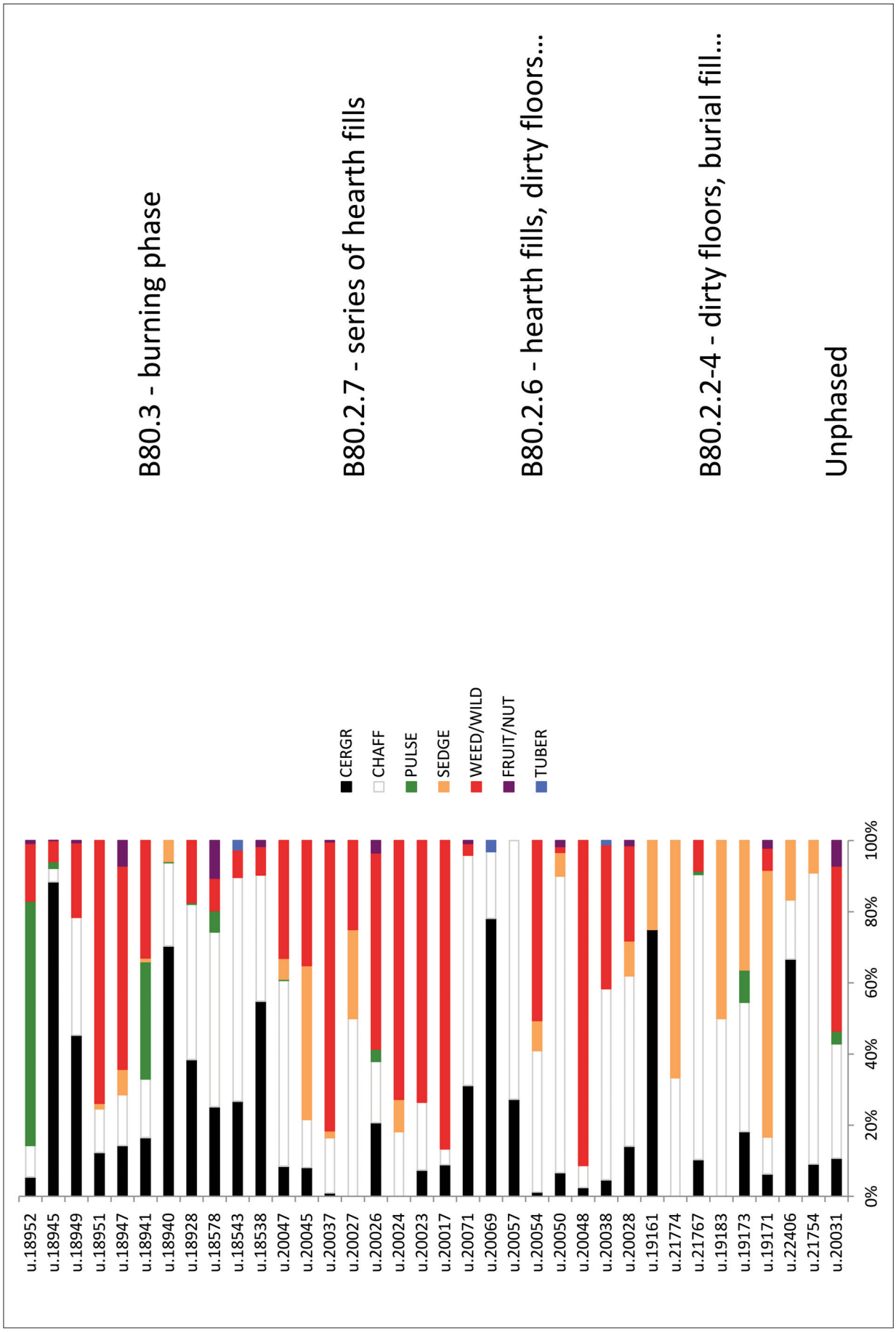


Figure S5.8. Building 80 (South O) – Archaeobotanical summary.

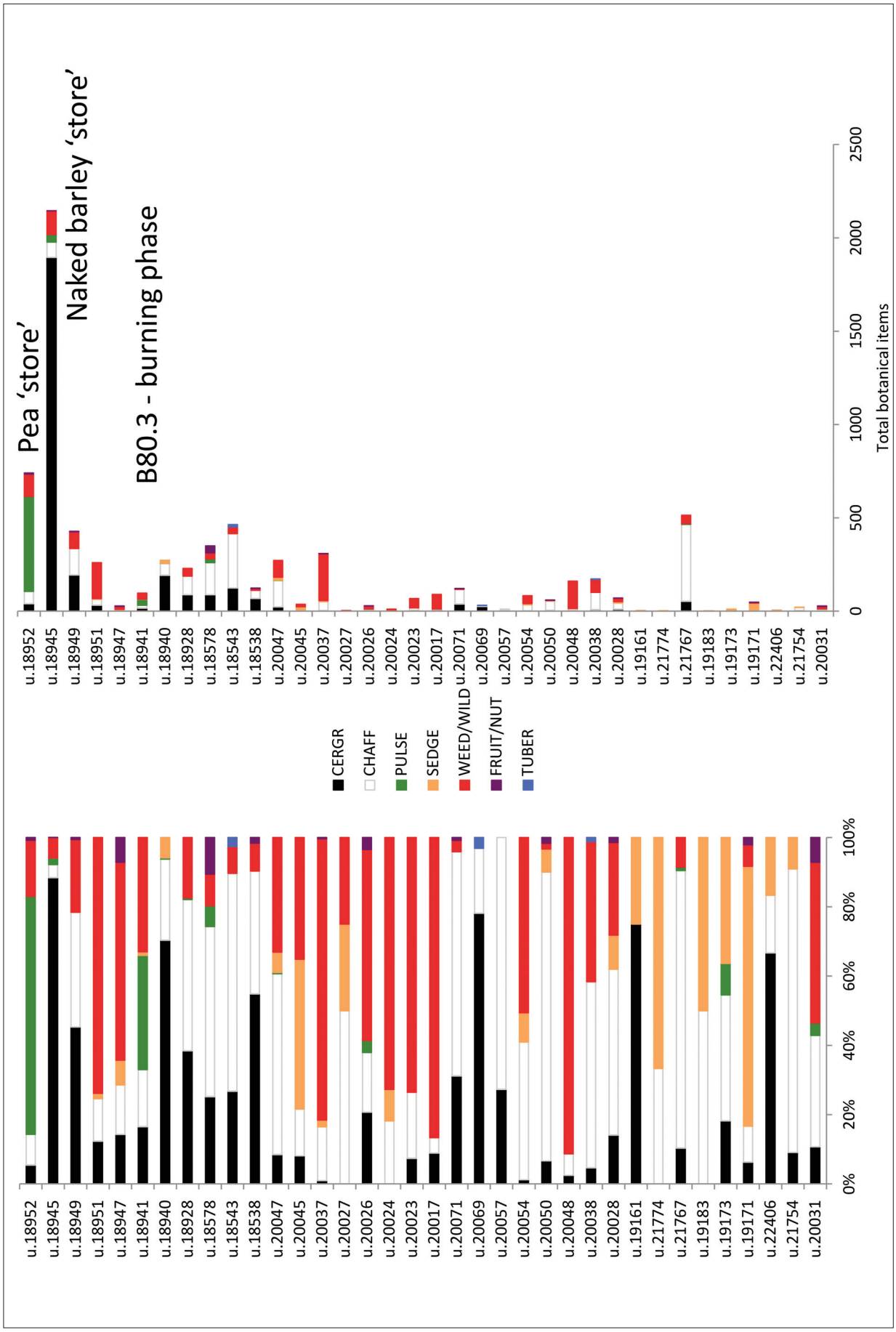


Figure S5.9. Building 80 (South O) – Archaeobotanical summary.

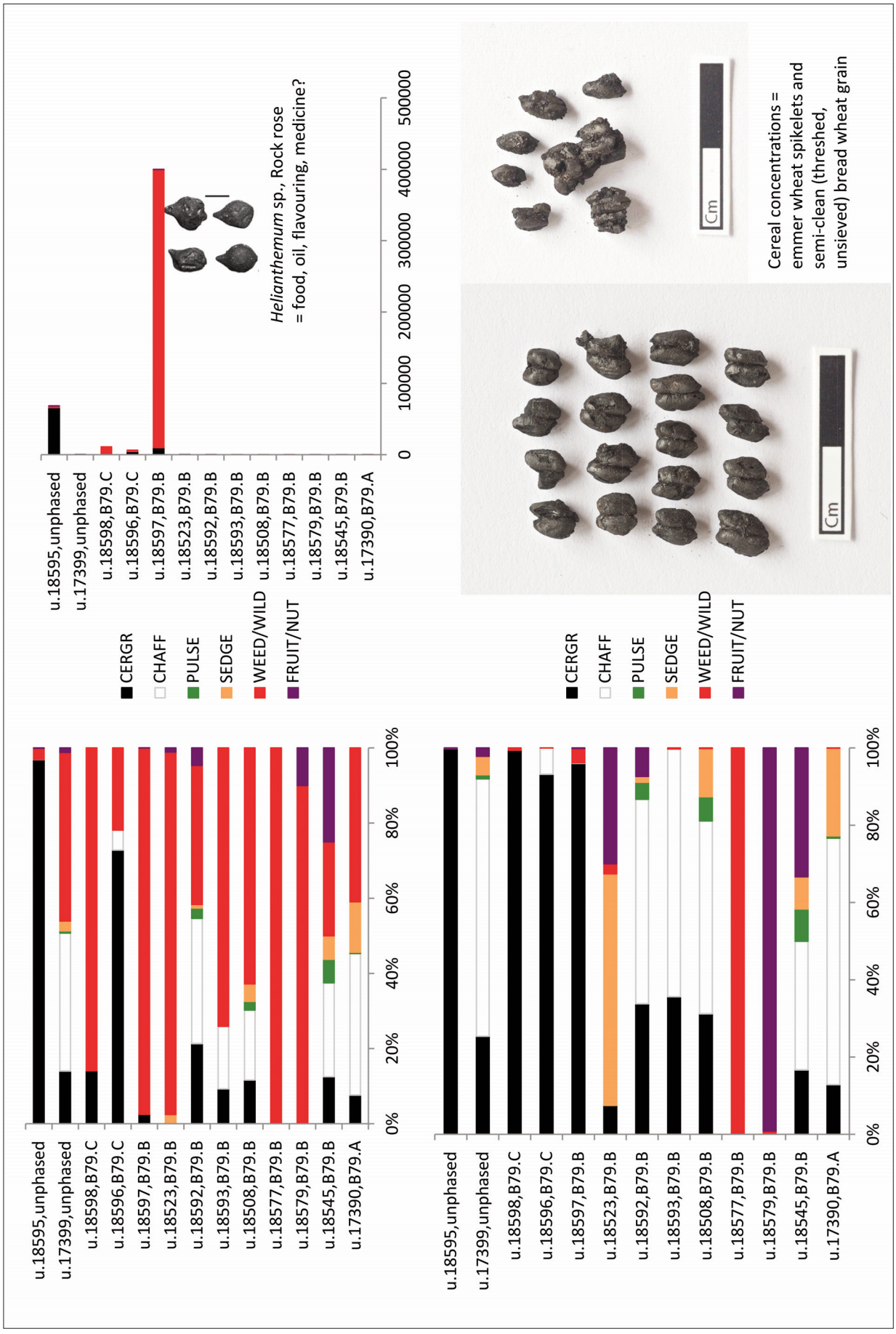
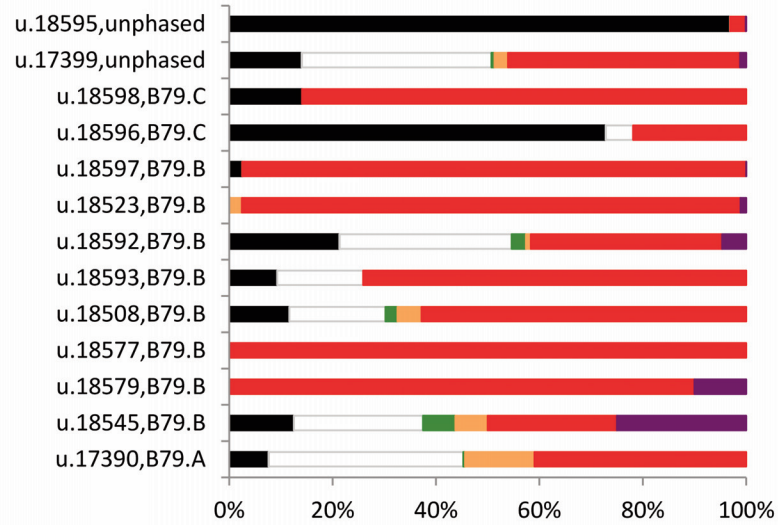
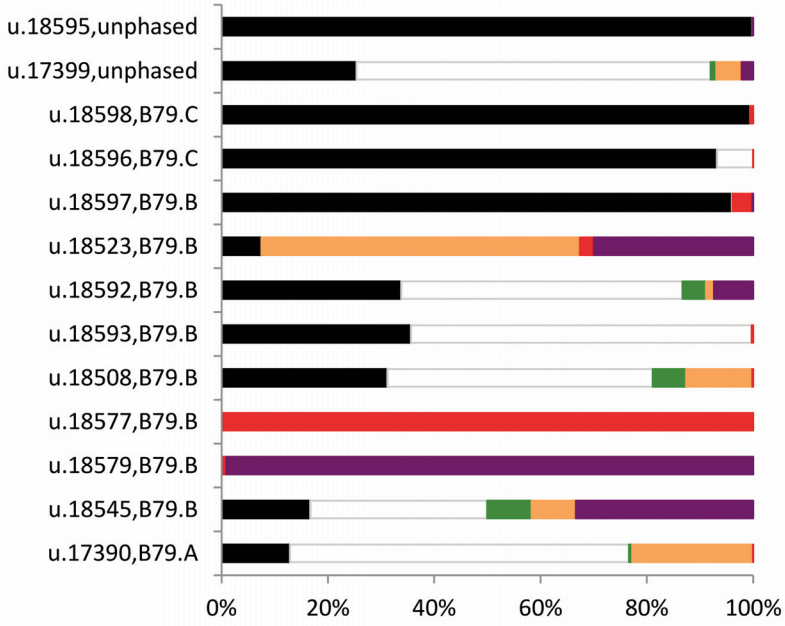


Figure S5.10. Building 79 (South O) – Archaeobotanical summary; in lower left bar chart, Helianthemum *downweighted (/1000) to clarify other components.*





In sum – destruction phase deposits on floor of Sp.134:

-**high-density** concentrations of tiny **rock rose (wild) seeds**

-high-density concentrations of **emmer and bread wheat**

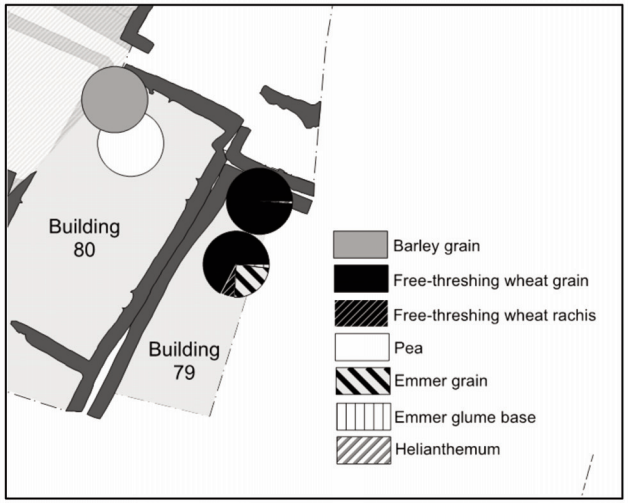


Figure S5.11. Building 79 (South O) – Archaeobotanical summary; in lower left bar chart, Helianthemum *downweighted (/1000) to clarify other components*

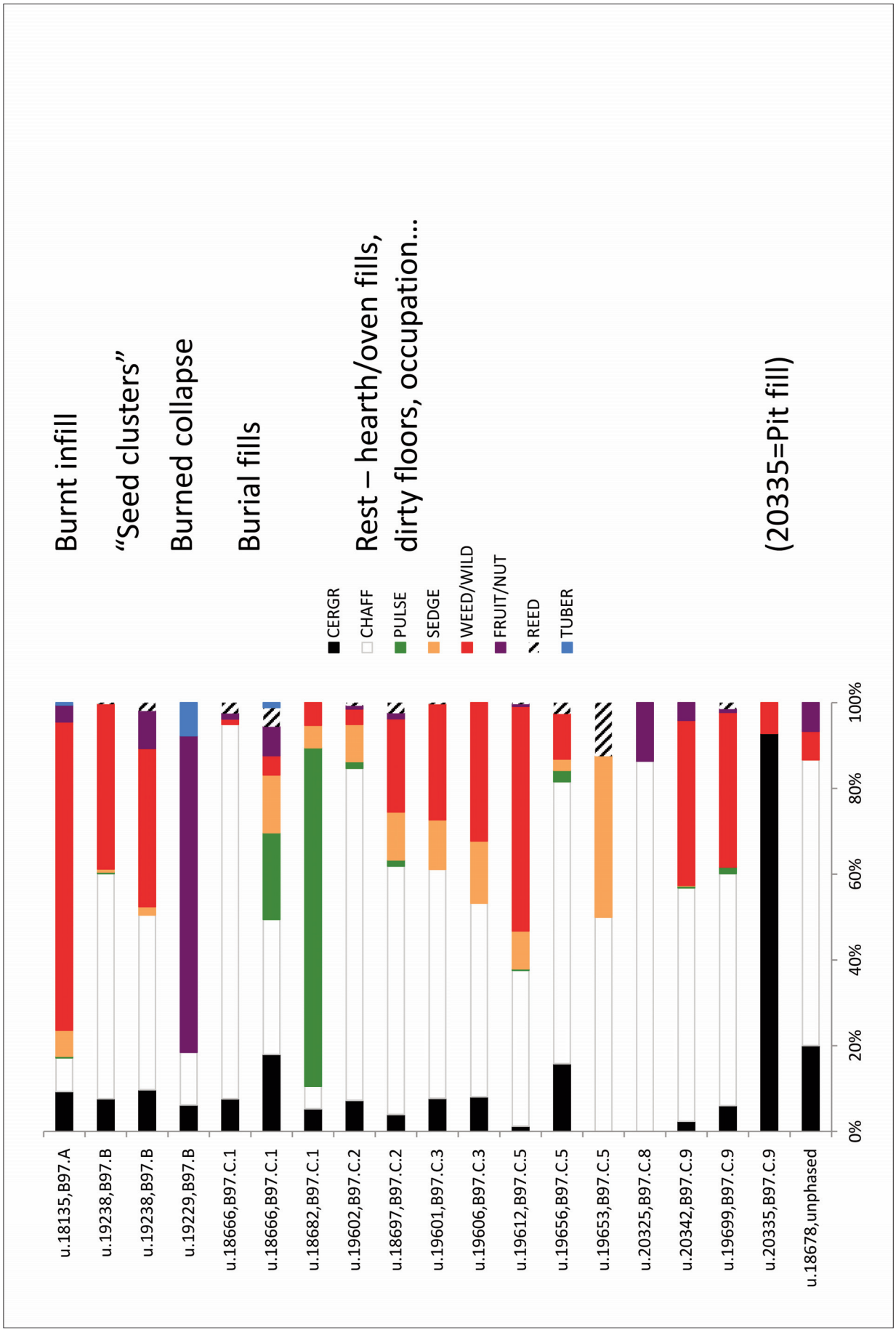


Figure S5.12. Building 97 (South O) – Archaeobotanical summary.

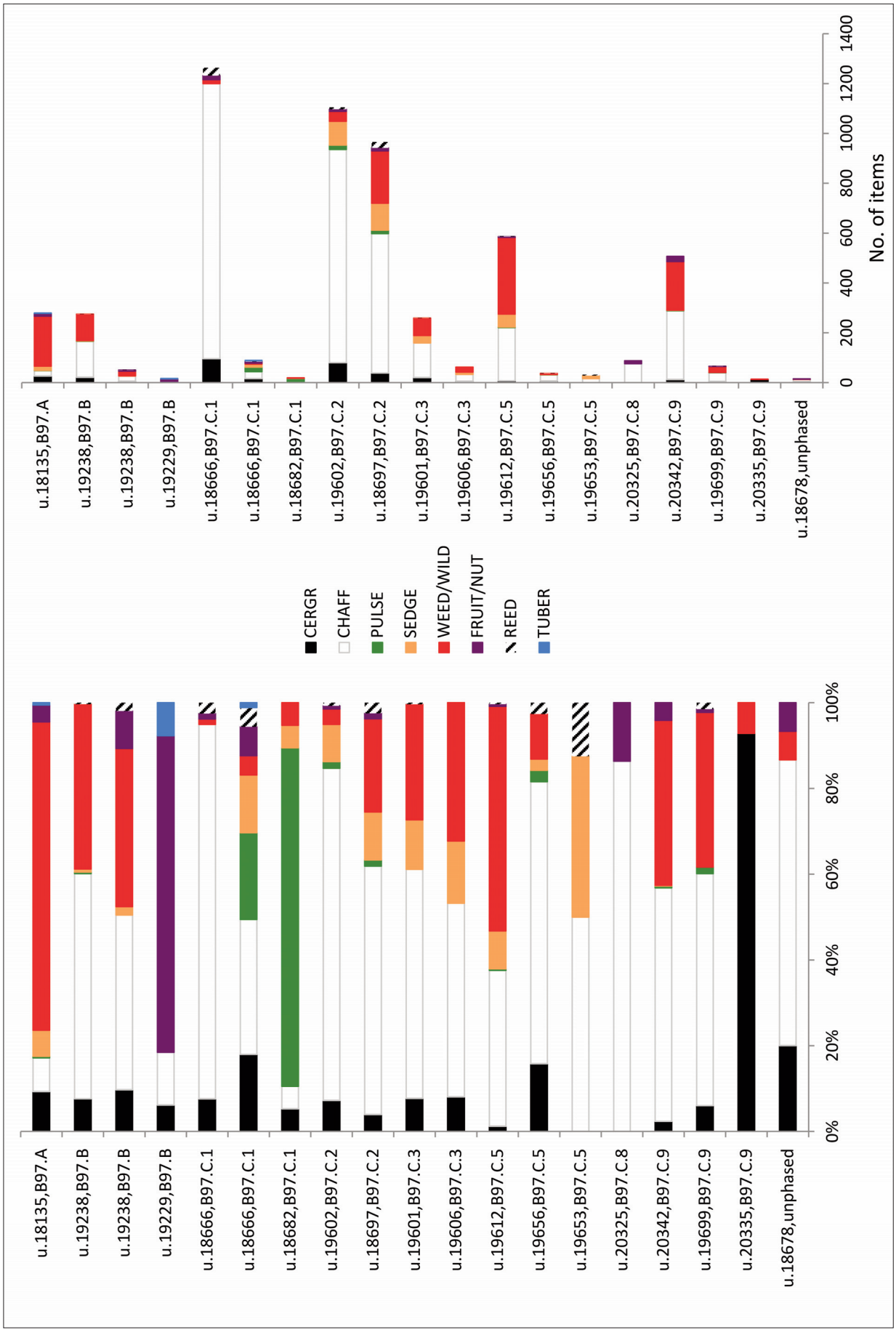


Figure S5.13. Building 97 (South O) – Archaeobotanical summary.

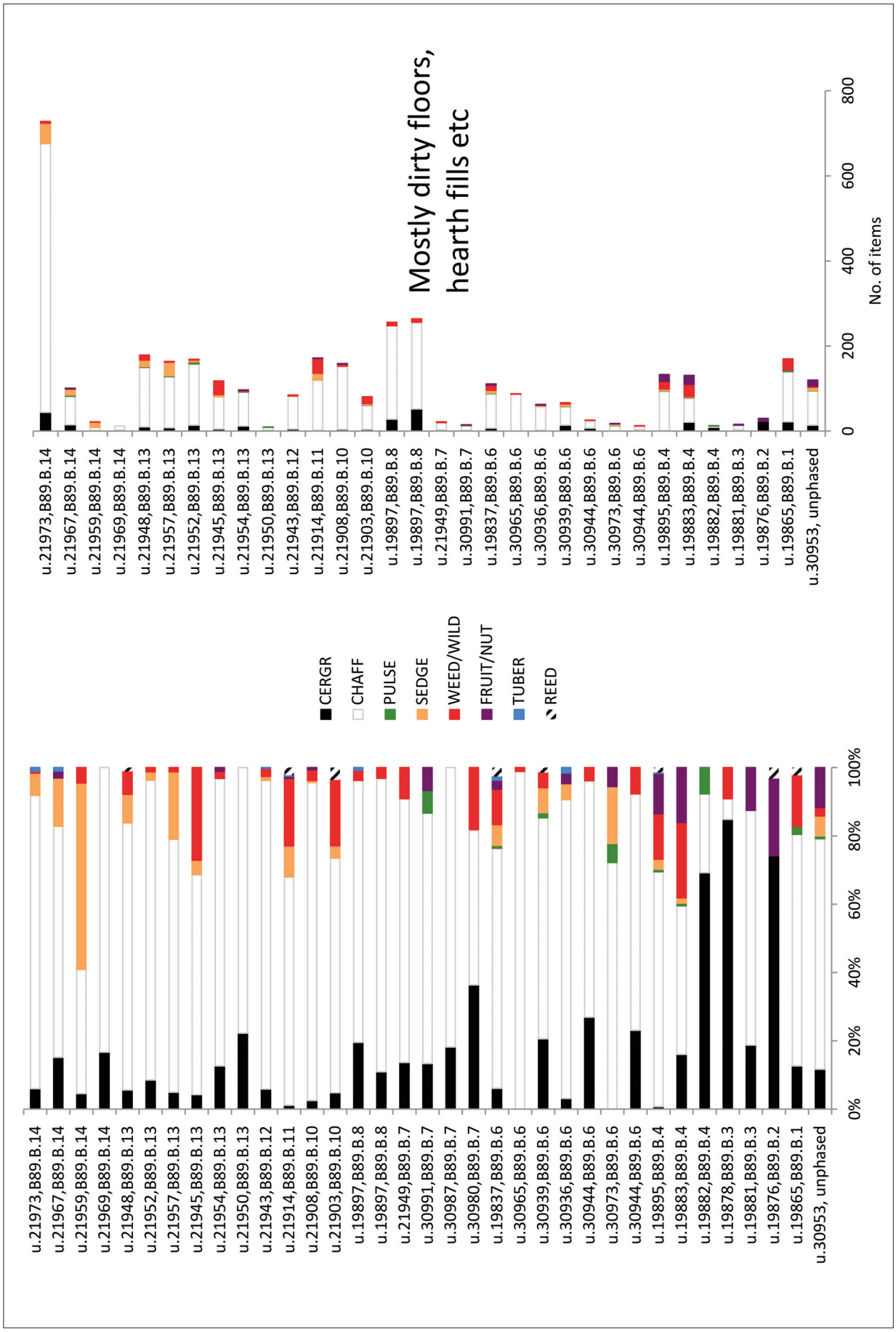


Figure S5.14. Building 89 (South M) – Archaeobotanical summary.

Figure S5.15. Building 160 (South K) – Archaeobotanical summary.

Abbreviation	*Category*	*Abbreviation*	*Category*
bargr	barley grain	boragin	Boraginaceae
barra	barley rachis	boreava	Boreava orientalis
ftwgr	free-threshing wheat grain	bromdan	Bromus danthoniae
ftwra	free-threshing wheat rachis	bromus	Bromus
gwgr	glume wheat grain	bud	Bud type
gwgb	glume wheat glume bases	carchen	Caryophyllaceae/Chenopodiaceae
cergr	cereal grain indeterminate	carex	Carex
bitvetch	btter vetch	caryoph	Caryophyllaceae
chickpea	chickpea	centaurea	Centaurea
grasspea	grasspea	chenalb	Chenopodium album
lentil	lentil	chenop	Chenopodium
pea	pea	chenopos	Chenopodiaceae
legind	legume indeterminate	composit	Compositae
legpod	legume pod	conrori	Conringia orientalis
legstalk	legume stalk	convolv	Convolvulus arvensis type
pistacia	Pistacia nutshell	smcrucif	Cruciferae, small
acorn	acorn nutshell	cruciflg	Cruciferae, large
fig	fig	crucifmd	Cruciferae, medium
almond	almond nutshell	crucind	Cruciferae indeterminate
almplum	almond nutshell/plum fruitstone	crypsis	Crypsis
prundiv	Prunus divaricata type fruitstone	cyperind	Cyperaceae indeterminate
prunus	Prunus fruitstone	cypermin	Cyperaceae indeterminate, mineralised
hackmin	hackberry, mineralised	eleocham	Eleocharis, mineralised
hackchar	hackberry, charred	eleochar	Eleocharis
fruitnut	fruitstone/nutshell	eragros	Eragrostis type
culm	culm (non-reed)	eremop	Eremopyrum
reedculm	reed culm	erodium	Erodium type
reedrhi	reed rhizome	fumaria	Fumaria
stalkind	stalk indeterminate	galism	Galium, small
adonis	Adonis	galitri	Galium tricornutum type
aelurop	Aeluropus	gramind	Gramineae indeterminate
alisma	Alisma	gramlg	Gramineae indeterminate, large
androsa	Androsace type	gramsm	Gramineae indeterminate, small
artemisia	Artemisia type	grsmlo	Gramineae, small elongated type
atriplex	Atriplex	helianth	Helianthemum
beta	Beta	heliotrop	Heliotropium
bolbgla	Bolboschoenus glaucus	hordind	Hordeum indeterminate
bolbglam	Bolboschoenus glaucus, mineralised	hordlol	Hordeum/Lolium

Online table S5.2. Abbreviations used in Bogaard et al. 2021: fig 5.14b.

Abbreviation	*Category*
hordmur	Hordeum murinum
hordspo	Hordeum spontaneum type
juncus	Juncus
labiatae	Labiatae
legind	Large legume indeterminate
lithosil	Lithospermum, silicified
malva	Malvaceae
myagper	Myagrum perfoliatum
phalaris	Phalaris type
poatri	Poa trivialis type
polyavi	Polygonum aviculare
polycon	Polygonum convolvulus
polycorr	Polygonum corrigilioides type
polygona	Polygonaceae
polygonu	Polygonum
potpod	Potentially identifiable pod
potseed	Potentially identifiable seed
rumex	Rumex
salsola	Salsola type
siderit	Sideritis type
silene	Silene
sleg	Leguminosae, small-seeded
solanac	Solanaceae, cf.
sporobol	Sporobolus
sporocry	Sporobolus/Crypsis type
suaeda	Suaeda
taengr	Taeniatherum grain
taenra	Taeniatherum rachis
teucrium	Teucrium
thymel	Thymelaea
thymmin	Thymelaea, mineralised
umbell	Umbelliferae
vaccpyr	Vaccaria pyramidata
valerian	Valerianella
verbena	Verbena
vicilat	Vicia/Lathyrus type
ziziph	Ziziphora

Online table S5.2 (Continued). Abbreviations used in Bogaard et al. 2021: fig 5.14b.