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Analysis of plant remains from Ballynamona 2, Co. Cork (E2429)

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Appendix 5 Plant remains

Analysis of the plant remains from Ballynamona 2, Co. Cork (E2429)

By Penny Johnston

Introduction

This short report details the results of plant remains analysis from Ballynamona 2, Co. Cork (E2429). The site comprised Early Neolithic, Beaker, Middle Bronze Age and Iron Age activity. However, the plant remains from the site were primarily derived from a Middle Bronze Age round house and some associated features.

Methodology

The samples were collected on site as bulk soil and were processed using machine-assisted floatation (following guidelines in Pearsall 2000). The floating material (or 'flot') from each sample was collected in a stack of geological sieves (the smallest mesh size was 250 μm). When all the carbonised material was collected the flot was then air-dried in paper-lined drying trays prior to storage in airtight plastic bags. The samples were scanned under low-powered magnification (x 10 to x 40) using a binocular microscope. Nomenclature and taxonomic order follows Stace (1997).

Results

The results of preliminary scanning are presented in Table 1 at the end of this report. A total of 105 samples were scanned. Plant remains were present in 55 samples (approximately 50% of the total number scanned). The identifications of retrieved plant remains are presented in Table 2. The plant remains assemblage included small amounts of hazelnut shells, a small quantity of flax and a large volume of cereal remains, including a large proportion of barley, a much smaller portion of wheat and a single grain of oat (Figure 1).

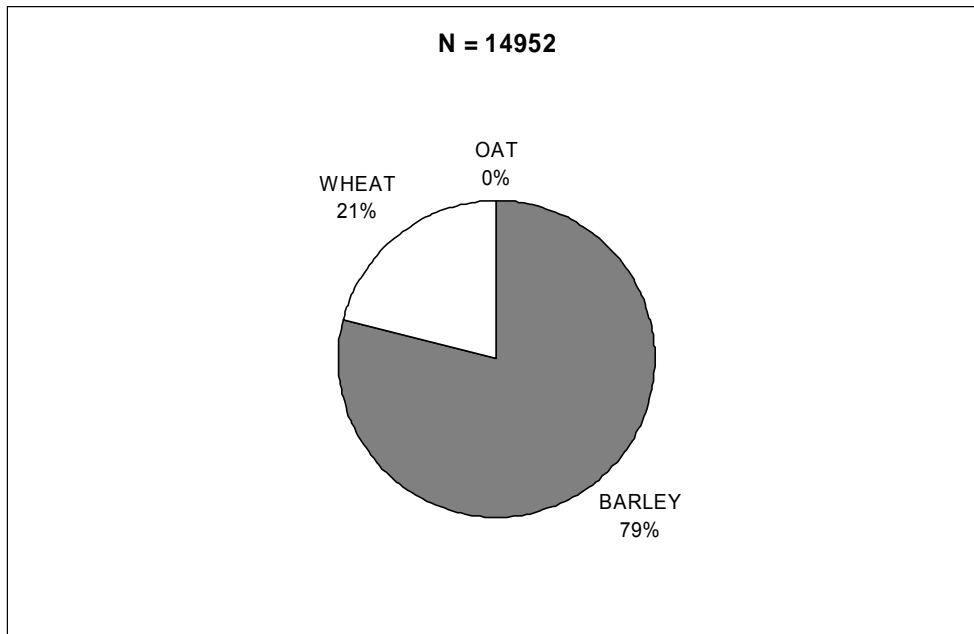


Figure 1: Percentage composition of the identifiable cereal assemblage from Ballynamona 2 (E2429).

Hazelnut shell fragments

A small quantity of the samples (13) contained hazelnut shell fragments, but these were generally present only in small amounts, with a total of 46 fragments counted. This is a much smaller quantity than that recovered at other settlement sites excavated along the route of the N8 Fermoy to Mitchelstown, for example samples from the Early Neolithic settlement site and Bronze Age burnt mounds at Ballinglanna North 3 included a total of over 500 hazelnut shell fragments. These plant remains are frequent finds in Irish archaeological sites, due partly to the fact that they were often collected, eaten and used in the past. Their frequency is also partly due to the taphonomic factors that govern the preservation of hazelnut shells (as outlined in Monk 2000, 74 – 75). Firstly, they have a dense cellular structure, which means that they are slow to decay. In addition, the nut shell fragments are waste, and the shells were broken open and thrown in the fire. The fact that they were often discarded in hearths means that they were very likely to come into contact with fire and were therefore frequently carbonised and preserved.

Barley (mostly naked barley)

Barley was overwhelmingly dominant in the cereal assemblage from Ballynamona 2 and this is generally the most common cereal type recovered from Irish Bronze Age deposits. For example, barley was the most common cereal type recovered from Bronze Age sites such as Lough Gur, Co. Limerick (Tierney and Hannon 2003), at Konckhouse Lower, Co. Waterford (Johnston 2007a, 14 – 15), Curraghatoor, Co. Tipperary (McClatchie

2007, 64), Chancellorsland Site A (McClatchie 2008, 475) and from Bronze Age deposits excavated along the route of the Gas Pipeline to the West (Johnston 2007b, 70) and along the route of the N8 Cashel to Mitchelstown (Halwas 2009, 265).

The barley grains from Ballynamona 2 were predominantly the naked variety, with only small quantities of hulled barley recovered from C.538, the fill of a pit (C.539) within Structure 1, and C.585, the fill of a post-hole (C.586) within Structure 1 (Figure 2). Naked barley was also recovered in large amounts from a Middle Bronze Age round house at Knockhouse Lower, Co. Waterford (Johnston 2007a, 14 – 15). This type of cereal is also found in smaller proportions at other Bronze Age settlement sites, e.g. at Crossreagh East, Co. Derry (McClatchie forthcoming), but it is not often the dominant type of barley recovered. The high portions of naked barley from both Ballynamona 2 and Knockhouse Lower remains bear close parallels to the evidence from pottery imprint studies, where, of thirty-four grain imprints from twenty sherds of Bronze Age pottery, all but three of the imprints were identified as naked barley (Jessen and Helbaek 1944).

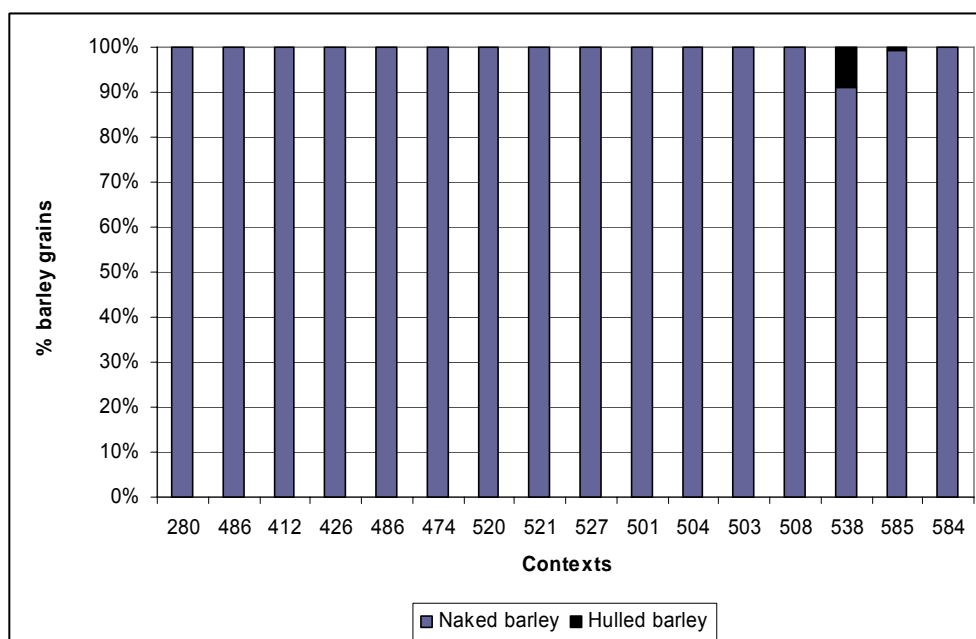


Figure 2: Relative proportions of hulled and naked barley in the richest samples from Ballynamona 2 (E2429)

Wheat (Emmer wheat)

Most of the wheat from Ballynamona 2 was emmer wheat. This type of wheat is occasionally present in Bronze Age deposits and at some sites it is more common than barley, e.g. at Crossreagh East, Co. Derry (McClatchie forthcoming). In some deposits from Ballynamona 2 emmer was more common than barley (Figure 3, where 'wheat' represents emmer wheat). However, it is not generally common in Bronze Age deposits

from this part of the country and along the route of the N8 Fermoy to Mitchelstown it is generally earlier, Neolithic, sites where emmer is most commonly recovered (for example Ballinglanna North 3, Early Neolithic deposits at Ballynacarriga 3 and Gortore 1).

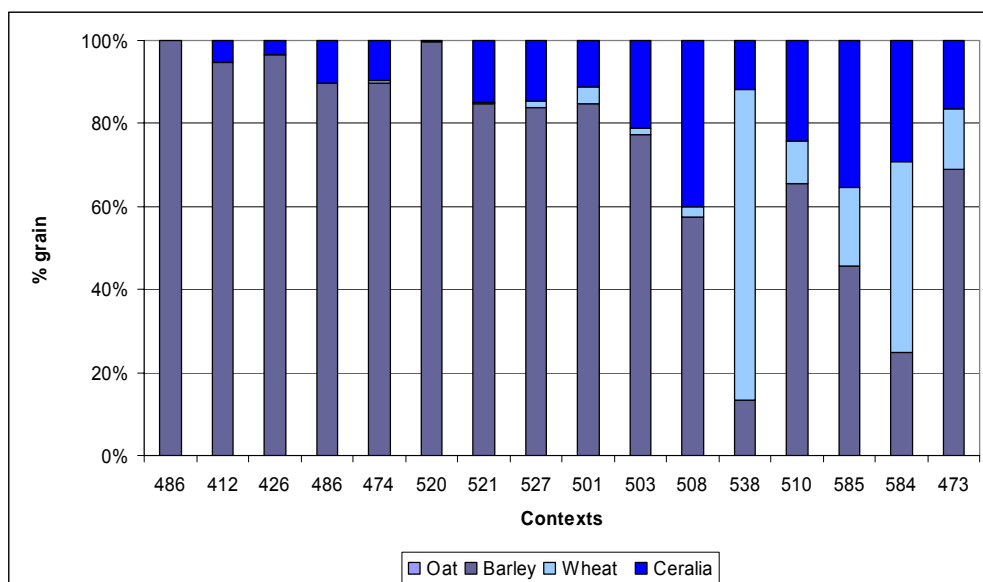


Figure 3: Percentage cereal distribution in the richest samples from Ballynamona 2

The only samples where wheat (emmer wheat) was identified in large amounts were taken from a pit (C.539) and an associated post-hole (C.636) inside the south-western part of the house, close to the entrance. This suggests that emmer was stored in this part of the house before it was burnt down, in particular in the south (Figure 4).

In both of these rich deposits the chaff items were identified as the glume bases and spikelet forks of emmer wheat. These were found in association with large amounts of emmer grain and it is likely that the grain was stored still enclosed within the chaff. Emmer is a hulled wheat and where the grain grows surrounded by protective 'hulls' or layers of plant material that grow around and cover many types of grain as they grow. Several emmer grains from Ballynamona 2 were found in association with glume bases, still attached around the bases of the grains. A relatively large quantity of these glume bases were found in these samples and it is likely that the emmer grains from this site were stored within the chaff, on the ear. This is said to help prolong the life and viability of stored grain because it helps prevent insect and fungal attack.

Oat

Oat grains were found in very small amounts at Ballynamona 2, with just a single grain recovered. Oat is relatively widespread in deposits from Irish Bronze Age sites, but it is generally only recovered in small amounts. McClatchie (2007, 65) argues that its role in

prehistoric agriculture is underestimated. If oats were used in prehistory, they were wild, uncultivated varieties, since the cultivated oat (*Avena sativa*) was not developed until the medieval period, and the deliberate cultivation of oat in Ireland appears to have commenced during the early medieval period (Kelly 1998). Unfortunately, it is impossible to distinguish between wild and cultivated varieties of oat in samples where floret bases are not present (these were not found at Ballynamona 2). In situations such as this, where oat is not considered a cultivated crop and where it has been found in such small amounts, these oat grains are interpreted as a crop weed.

Weeds

Weeds were an integral part of prehistoric fields in the days before industrial weed killers made crop fields more uniform. However, the majority of the samples from Ballynamona 2 were relatively free of weeds. This suggests that the cereals from this site had been partly processed prior to carbonisation. Processing is usually carried out in order to remove items such as straw, chaff and weeds from a harvested grain crop. This is done by a series of time consuming activities (such as winnowing, threshing and sieving) that gradually removed contaminating items from the cereal crop. This helped to eliminate items such as poisonous and poor-tasting weed seeds, as well as straw and chaff (Dennell 1974, 132).

Flax

However, there is small number of samples where significant quantities of weed seeds were recovered. These were taken from the pits C.509 (C.508 (S.454)) and C.511 (C.510 (S.474)) that were found near the centre of the house. In the first pit (C.509) the ratio of cereal grains to weed seeds was 41:51 (123 cereal grains and 153 weed seeds). In the second pit (C.511) the ratio of cereal grains to weed seeds was 3:2 (75 cereal grains and 50 weed seeds). Most of these weed seeds were identified as linseed or flax and it possible that these are not necessarily weed seeds at all, but represents the remnants of a deliberately cultivated crop that was mixed in with or stored with the cereal crops. Cultivated flax seeds appear in Irish archaeobotanical deposits from at least the Early Neolithic, for example some flax seeds were found in deposits associated with a rectangular house excavated at Crossreagh East, Co. Derry (McClatchie forthcoming). Flax impressions are also known from Bronze Age pottery (Monk 1986/87, 32) and some pollen studies indicate flax cultivation at several Irish locations from the Middle and Late Bronze onwards (e.g. Doody 1995, 18; Mallory 1995, 79). Flax was a useful plant and the leaves could be used for fodder for livestock, linen could be made from the stalk, and the seeds could be collected for oil and human consumption. In general the large quantities of flax seeds were found in samples that were associated naked barley but the significance of this association is not clear.

Interpretation

The richest samples from Ballynamona 2 were selected for further, more detailed analysis. A total of 16 of the samples contained more than 50 identifiable cereal grains. These were from pits within Structure 1 C.487 (C.486 (S.403), C.486 (S.435), C.520 (S.447), C.521 (S.448) and C.527 (S.449)), C.504 (C.501 (S.450) and C.503 (S.452)),

C.509 (C.508 (S.454)), C.539 (C.538 (S.473)) and C.511 (C.510 (S.474)), two post-holes within Structure 1 C.586 (C.585 (S.487)) and C.636 (C.584 (S.520)), two pits to the north of the building C.413 (C.412 (S.407)) and C.417 (C.426 (S.412)) and the slot trench of Structure 1 C.472 (C.474 (S.436)) and C.473 (S.520)). The majority of these samples were associated with Structure 1.

The fact that many of the richest samples were relatively free of contaminating items such as straw, chaff and weeds, suggests that the crops were probably prepared in preparation for consumption. Other reasons for grain storage could possibly be that the grain was saved in large caches for seed grain for the following year. However, there is no pressing reason to go to great lengths to process grain crops, to remove weeds, from seed grain. Therefore it is likely that the grain from this site was largely stored for human consumption, rather than as seed grain.

Chaff was found only in association with emmer grains and it appears that this type of grain was stored on the ear, enclosed by protective hulls. The presence of hulls means that the cereals need to go through a complicated series of crop processing stages before they can be used as food. Removal of chaff and coarse plant material from the crop is a time consuming process. Where hulls are present, the stages of crop processing can include threshing, raking, winnowing, coarse sieving, pounding and fine sieving. At each stage of crop processing more weed seeds and chaff items are removed from the crop.

One of the most interesting aspects of the assemblage Ballynamona 2 is the almost complete absence of weed seeds and stalk items and other chaff (apart from emmer glume bases). This suggests that these crops were fully processed before they were burnt.

The harvest was one of the most important times of the agricultural calendar. Harvest required the ability to mobilise large amounts of people and labour. Archaeobotanists sometimes suggest that the composition of charred seed assemblages may help to distinguish between small individual 'household' organisation of the harvest and that of larger 'communal' organisation of the harvest. This is partly because household organisation tends to harvest and store the crop in quick succession, with crop processing being carried out piecemeal, as it is required (see Stevens 2003 for a discussion). However, large scale crop processing, as is indicated by the large amounts of fully cleaned grain and semi-cleaned spikelets found at Ballynamona 2, usually takes place in the short space of time immediately after harvest, when the labour force is still mobilised and while the weather is still dry. The cleaned grain found at Ballynamona 2 therefore suggests a communal approach to the harvest. The fact that another, unexcavated house was located nearby is perhaps another indicator that these archaeological remains represent those of an organised community, rather than simply an individual household. It is possible that the archaeobotanical evidence from Ballynamona 2 holds some important clues for us when we talk about the character of the societies and the communities that occupied these sites.

Summary

In general the crop remains found associated with Structure 1 at Ballynamona 2 appear to represent large deposits of stored grain that were, presumably, accidentally destroyed by fire and carbonisation. The remains indicate that the crops have been subjected to quite a large degree of preliminary processing, indicating that they were being prepared for food consumption. Naked barley was the most common cereal type found. Emmer wheat was also found in significant quantities. Non-cereal plants included flax. There were very few seeds from weed seeds in these deposits.

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March 2010

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Sample	Context	Charcoal	Seeds	% scanned
1	3	l	a	100
5	9	L	A	100
17	21	L	A	100
19	23	h	a	100
25	31	m	l	100
31	49	H	A	100
32	39	L	L	100
39	59	m	l	100
43	61	A	M	100
44	66	M	A	100
45		H	A	100
46	63	l	a	100
47	53	M	A	100
49	69	L	L	100
50	71	M	A	100
51	37	L	A	100
53	72	L	L	100
54	76	l	a	100
55	78	L	L	100
57	82	L	L	100
60	85	m	l	100
63	88	H	A	100
65	95	L	L	100
67	93	h	a	100
71	99	M	L	100
77	105	m	a	100
78	110	h	a	100
79	117	A	L	100
80	116	m	l	100
84	123	H	A	100
85	128	M	A	100
86		h	a	100
88	130	h	a	100
92	133	H	A	100
93	136	h	a	100
100	141	m	l	100
101	143	M	A	100
103	145	L	A	100
105	148	M	A	100
106	150	l	a	100
107	159	M	A	100
110	164	L	A	100
111	167	L	L	100
112	168	M	A	100
113	170	L	A	100

Sample	Context	Charcoal	Seeds	% scanned
114	172	L	L	100
115	166	m	l	100
116	176	l	a	100
118	174	M	A	100
153	261	m	l	100
155	266	l	a	100
156	267	l	a	100
159	272	l	a	100
161	280	h	h	100
162	285	m	a	100
164	254	m	m	100
166	296	h	l	100
167	282	h	a	100
268	157	M	L	100
400	400	L	A	100
403	403	L	A	100
403	486	M	H	50
407	412	L	H	100
410	422	L	L	100
412	426	m	l	100
416	438	M	L	100
417	436	l	l	100
419	444	H	L	100
420	448	m	l	100
422	457	l	a	100
428	468	M	L	100
430	464	m	a	100
434	483	H	M	100
435	486	m	h	100
436	474	L	H	100
444	519	H	L	100
447	520	l	h	25
448	521	H	H	100
449	527	M	H	100
450	501	h	h	45
450	504	M	H	11
452	503	h	m	100
454	508	H	H	100
458	490	L	L	100
461	495	m	a	100
465	531	m	l	100
467	544	H	A	100
468	542	L	L	100
469	573	m	l	100
473	538	M	H	14
474	510	H	H	100
475	580	M	L	100

Sample	Context	Charcoal	Seeds	% scanned
476	582	M	M	100
477	576	L	A	100
487	585	H	H	100
487	586	H	H	100
490	578	L	L	100
491	587	I	a	100
499	513	H	L	100
501	610	I	a	100
505	618	m	a	100
508	626	I	I	100
515	584	M	H	50
519	656	L	L	100
520	473	M	M	100

A = Absent, L = Low, M = Medium and H = High

Table 1: Scanned samples from Ballynamona 2, Co. Cork (E2429)

Table 2: Identified seeds from Ballynamona 2, Co. Cork (E2429) continued

Sample	444	447	448	449	450	452	454	458	465	468
Context	519	520	521	527	501	503	508	490	531	542
% sorted	100	100	100	100	66	100	100	100	100	100
Indeterminate seeds from the goosefoot family (Chenopodiaceae)							1			
Probable Sheep's sorrel (<i>Rumex cf acetosella</i> L.)		1								
Indeterminate seeds from the Knotgrass family (Polygonaceae)		1	1		5		2			
Flax seed fragments (<i>Linum</i> L. species)				1	3		139		1	
Possible oat grains (cf <i>Avena</i> species)					1					
Barley grains (<i>Hordeum vulgare</i> L.) Naked grains	3	3353	880	110	1900	123	111	3		4
Probably naked barley grains (<i>Hordeum vulgare</i> L.) Naked grains					315					
Possible hulled barley grains (<i>Hordeum vulgare</i> L.) hulled grains					1					
Barley grains of indeterminate species (<i>Hordeum</i> species)		1	150	150	204	67	7	1 4		
Emmer wheat (<i>Triticum dicoccum</i> L.) two seeded grain				5	119	4	5			
Probable Emmer wheat (<i>Triticum cf dicoccum</i> L.) two seeded grain			2					3		
Emmer wheat (<i>Triticum dicoccum</i> L.) spikelet forks					2					
Emmer wheat (<i>Triticum dicoccum</i> L.) glume bases					4		2	7		
Barley/Wheat grains (<i>Hordeum/Triticum</i>)									1	
Indeterminate cereal grains		12	181	45	316	52	82		1	
Indeterminate grass seeds (Poaceae)		8	5		1		7			
Indeterminate weed seeds			2		1	1	4			1

Table 2: Identified seeds from Ballynamona 2, Co. Cork (E2429) continued

Sample	469	473	474	475	476	487	490	499	508	515
Context	573	538	510	580	582	585	578	513	626	584
% sorted	100	14	100	100	100	100	100	100	100	50
Hazel nut shell fragments (<i>Corylus avellana</i> L.)	2									
Indeterminate nut kernels			8							
Indeterminate seeds from the goosefoot family (Chenopodiaceae)								1		3
Indeterminate seeds from the Knotgrass family (Polygonaceae)	1	1			1					2
Flax seed fragments (<i>Linum</i> L. species)			48					2		
Barley grains (<i>Hordeum vulgare</i> L.) Naked grains					7	44		4		173
Probably naked barley grains (<i>Hordeum vulgare</i> L.) Naked grains		176	63			126	2			51
Barley grains (<i>Hordeum vulgare</i> L.) hulled grains		17								
Possible hulled barley grains (<i>Hordeum vulgare</i> L.) hulled grains						1				
Barley grains of indeterminate species (<i>Hordeum</i> species)	6	170	2	6	14	70		4		209
Emmer wheat (<i>Triticum dicoccum</i> L.) two seeded grain		2054	10			90				780
Probable Emmer wheat (<i>Triticum cf dicoccum</i> L.) two seeded grain						7				
Emmer wheat (<i>Triticum dicoccum</i> L.) spikelet forks		96	2			1	1			49
Emmer wheat (<i>Triticum dicoccum</i> L.) glume bases		408	1							100
Indeterminate wheat (<i>Triticum</i> spp.) spikelet forks										4
Indeterminate wheat (<i>Triticum</i> spp.) glume bases										6
Probable emmer wheat (<i>Triticum cf dicoccum</i> L.) glume bases	1									
Wheat grains (<i>Triticum</i> L. species)					5	2		3		27
Possible wheat grains (cf <i>Triticum</i> species)	24									
Indeterminate cereal grains	21	320	24		20	187			1	509
Indeterminate grass seeds (Poaceae)						1				5
Indeterminate weed seeds			2		2	1	1			

Table 2: Identified seeds from Ballynamona 2, Co. Cork (E2429) continued

Sample	519	520
Context	656	473
% sorted	100	100
Indeterminate seeds from the Knotgrass family (<i>Polygonaceae</i>)		1
Probably naked barley grains (<i>Hordeum vulgare</i> L.) Naked grains		67
Barley grains of indeterminate species (<i>Hordeum</i> species)	1	
Emmer wheat (<i>Triticum dicoccum</i> L.) two seeded grain		14
Indeterminate cereal grains		16

