Plant remains from Middle Bronze Age round houses in north Cork

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Executive Summary

This report presents the results of an archaeobotanical study on material from two Middle Bronze Age house sites in north Cork. The project, funded by the Royal Irish Academy, builds on work previously carried out as a result of developer funded excavations. The study contrasts the plant remains found at two round house sites, found *c*. 3 km apart, and located within the rich farmland around Mitchelstown, Co. Cork. The first site, Ballynamona 2, had an extraordinarily rich assemblage of naked barley and emmer wheat. These represent a processed, stored harvest, and were probably burnt in one, catastrophic fire. In contrast, the remains from Mitchelstown 1 were primarily from weed seeds. These were initially thought to have represented a collected wild food, but the results from this work suggest that they are the remains of piecemeal crop processing. Comparing and contrasting the results from these sites suggests that Middle Bronze Age plant economies and social organisation was subsistence based, and centred around the nuclear family at Mitchelstown 1, at the start of the period. A short time later (probably two hundred years at the most), the results from Ballynamona 2 indicate more an ability to mobilise labour for both harvesting and processing at one of the busiest times of the year. This indicates social organisation that is more complex and hierarchical than that of the nuclear family.

Introduction

The number of known Bronze Age round houses[1] has multiplied significantly in the past two decades (see Ó Néill 2010 and Doody 2007 for a discussion of houses in Munster). These discoveries have provided a welcome opportunity for archaeobotanists to study the evidence for exploitation of plant resources at domestic sites. This is particularly the case since many early studies of plant remains were focused on evidence retrieved from funerary contexts, specifically imprints of seeds from funerary pottery (Jessen and Helbaek 1944), while results from other projects have shown that retrieval from some domestic sites can be significantly poorer than from funerary and ritual sites (Johnston 2007). The conclusions drawn from a collection of small assemblages tend to be, of necessity, general. They focus on the main economic crops retrieved during archaeobotanical investigations. The usual conclusion is that barley was the most common cereal, and that this was frequently a hulled variety of barley (e.g. Halwas 2009, 265; McClatchie 2008, 475; Johnston 2007, 70).

However, amalgamating the rich new corpus of information from round house excavations now allows us to reflect on how differences and similarities may contribute to our understanding of the Bronze Age plant economy in general. The new data also allows us to focus our attention on particular localities, and on particular periods within the Bronze Age. This is the aim of the research presented here. The locality selected was the Mitchelstown area of North Cork, and the period was the Middle Bronze Age. Two round house sites were found in close proximity to one another, *c*. 3 km apart, at Ballynamona 2 and Mitchelstown 1. Each site had more than one round house (at least five were identified, three at Mitchelstown 1 and two at Ballynamona 2) and the radiocarbon date range from the houses were both within the Middle Bronze Age (although the site at Ballynamona 2, with a date range from *c*. 1380–1030 cal BC was probably somewhat later than the houses at Mitchelstown 1, where the dates ranged from c. 1490–1220 cal BC). Given the superficial similarities and their close proximity, it seems reasonable to assume that both sites had access to similar resources. This, combined with the similarities in site types, could tempt one to suggest that both sites operated within a similar economy. One of the only means of investigating the basis of this economy is through the study of charred plant remains, since other economic evidence, such as animal bone, was not preserved at the sites.

The charred plant remains from both Ballynamona 2 and Mitchelstown 1 were examined during routine post-excavation work (referred to here as 'Phase 1') and the results were included in the final excavation report for each site (Johnston 2011a & b). This work revealed that, instead of producing two very similar

[1] The word 'house' is used loosely throughout the paper, and in general it simply refers to a building type typically regarded as a dwelling place by archaeologists, not necessarily one with direct evidence for domestic occupation.

plant assemblages, the results were remarkably different: Ballynamona 2 produced a rich assemblage of charred grain and few weeds (see Johnston 2010), while the remains from Mitchelstown 1 were exactly opposite, with a relatively rich assemblage of weeds and almost no grain. Significantly, the weed seeds from Mitchelstown 1 were a type that may have been collected as food. Given these results, it is possible that separate interpretations of the results from one or other of these sites could lead one to wildly different conclusions about the economies of Middle Bronze Age round houses in the area. Ballynamona 2, for example, had grain in such great quantities that it was questionable whether this was truly a 'house' site; perhaps a description as a granary would have been more appropriate. Such terminology comes with connotations of centralised storage and of re-distribution and has major implications for how we view the Middle Bronze Age economy, and indeed the society, in general. On the other hand, the assemblage from Mitchelstown 1 seemed to suggest a reliance on wild foods, with very little evidence for grain at all, and consequently suggests either relative poverty or an economy that is heavily reliant on gathered, rather than farmed, plant foods. Such divergent pictures of Middle Bronze Age domestic economy, from nearby sites, deserves further investigation. This Royal Irish Academy funded research project aimed to add to the data obtained during the initial analysis of the material from both sites (this work is referred to as 'Phase 2' throughout this paper). The combination of results from Phase 1 and Phase 2 will be used to interrogate the economic information from both site, and, based on the results, to propose a model for the economic use of plants at these tightly dated Middle Bronze Age round house sites.

Specifically, the aims of this project were threefold:

1. To augment the assemblages from both sites by analysing samples that have been in storage since the excavations (to ascertain whether Phase 1 results were real, or the result of insufficient sampling and/or sampling bias).
2. To re-assess the Phase 1 results from both sites in the light of new data from Phase 2 and, where appropriate, to re-interpret the plant remains assemblage.
3. To examine whether plant remains results from one or two sites, even when tightly dated and within a small locality, are a reliable indicator of the plant economy in general.

Methodology

The samples from both sites were collected on site as bulk soil. They were processed by flotation, using a combination of simple, bucket-based manual flotation and machine-assisted flotation. Phase 1 samples from Ballynamona 2 were processed using machine-assisted flotation (following guidelines in Pearsall 2000) while Phase 1 samples from Mitchelstown 1 and all the Phase 2 samples from both Mitchelstown 1 and Ballynamona 2 were processed by manual flotation, where each sample was saturated in water to allow carbonised plant material to float; this "flot" (the floating material) was then poured into a stack of geological sieves and trapped in the sieve meshes. The flots processed by machine-assisted flotation were also collected in geological sieves. In both cases the smallest sieve mesh measured 250 microns. When all the carbonised material (the flot) was collected from both samples it was air-dried in paper-lined drying trays prior to storage in airtight plastic bags. Sorting and identification of the flots was carried out using a low-powered binocular microscope (magnification x10 to x40) and identified seeds were separated and stored in sealed glass phials. Nomenclature and taxonomic order follows Stace (1997).

Background

The sites at Ballynamona 2 and Mitchelstown 1 were found before construction of two roads in north Cork. Ballynamona 2 (excavated in 2007) was found along the route of the N8 Fermoy to Mitchelstown road and Mitchelstown 1 (excavated in 2005) was found along the route of the N8 Mitchelstown Relief Road. Excavation and post-excavation works (including Phase 1 plant remains analysis) for both sites were carried out by Eachtra Archaeological Projects and were funded by the National Roads Authority through the National Development Plan. At both Ballynamona 2 and Mitchelstown 1 an extensive sampling programme was carried out, but there was insufficient funding to process and analyse all of these. Since Phase 1 plant remains results from both sites were intriguing, the remaining samples have been kept in storage for between four and six years. These samples were recently sieved by volunteer work placement interns at Eachtra Archaeological Projects. They were subsequently analysed by the author as part of this research project.

Phase 1

Ballynamona 2 comprised two Bronze Age round houses, metalworking features, a cremation pit and a burnt mound/*fulacht fiadh* (Hegarty 2011). Only one house (Structure 1) was excavated, the second house was not found within the area of the development so it was recorded and then covered over to be preserved *in situ*. The plant remains analysis focused on the remains from Structure 1, which were extremely rich; charred cereal grains were visible to the naked eye during excavation and almost 17,000 grains (mostly naked barley with some emmer wheat) were recovered from samples. Emmer was particularly common in the south-western part of the house, close to the entrance. This suggests that it was stored in this part of the house before it was burnt down. Artefacts such as rubbing and quern stones, objects that indicate that the building had a role in storing and processing cereal crops, were also found (Johnston 2010). The results indicate that the crop was already prepared for consumption and storage when it was charred, as there were almost no weed seeds in the samples. There were three Middle Bronze Age radiocarbon dates from Structure 1. Two of these were taken from barley grains, 1380–1131 cal BC (UBA-14111) and 1258–1029 cal BC (UBA-14113). A third date of 1386–1212 cal BC (UBA-14152) was obtained from a hazelnut shell fragment.

The richest samples from Ballynamona 2 were relatively free of contaminating items such as straw, chaff and weeds, suggesting that the crops were probably already prepared for consumption before they were charred. 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, possibly to prevent infection or damage during storage. The harvest was one of the most important times of the agricultural calendar, requiring 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, un-excavated 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.

Mitchelstown 1 comprised three circular houses, House A, House B and House C (Cotter 2011). House C was stratigraphically the earliest of the three, and was cut at its northern end by House A and at its southern end by House B. The plant remains assemblage from Mitchelstown 1 contained almost no cereal grains and a much larger assemblage of weed seeds. Most of the weed seeds were identified as members of the Knotgrass family (Polygonaceae) and they were relatively abundant in some samples. It is possible that these were deliberately collected as food, in which case their presence in these samples may represent a gathered wild plant rather than a weed, which is a plant in the wrong place. Radiocarbon dates from Mitchelstown 1 House C indicated Middle Bronze Age occupation at 1419–1223 cal BC (UB-6773). The plant remains assemblage from this house was not rich; there were no cereal grains and only a few seeds from the Knotgrass family and hazel nut shell fragments were found. At House B charcoal returned a Middle Bronze Age date of 1431–1267 cal BC (UB-6774) and the plant remains included large quantities of seeds from the Knotgrass family, as well as indeterminate cereal grains. At House A charcoal returned another Middle Bronze Age date of 1493–1305 cal BC (UB-6771) and the plant remains assemblage was rich in the remains of weeds, in particular seeds from the Knotgrass family. The identifiable cereal grains were mostly from barley, but there was also chaff from a glume wheat (emmer or spelt) and there was a fragment of a wheat grain.

The plant remains from the site were predominantly weeds from the Knotgrass family; 255 seeds of this type were recovered. Many were not identified to genus or species level because they were either in a poor state of preservation and therefore further identification was impossible, or because these seeds have such a wide ecological platform that more detailed, time-consuming, identification was deemed unnecessary as it was unlikely to provide further information. These plants are hardy ruderals that colonise waste and disturbed ground, often growing in or around areas of human settlement. They can also grow as crop weeds, for example the seeds of Black bindweed (*Fallopia convolvulus*) which was found in some of the deposits at the site. This may explain the presence of some of the plant remains; they could have been brought to site as weeds associated with cereal crops. However, this was seen as unlikely during Phase 1, as the weeds were not associated with any crop-processing by-products (such as chaff fragments or other weed types). In addition, the Knotgrass seeds were found in unusually large amounts, in particular given the paucity of other plant types, and they were spread throughout the contexts at the site. They were much more prevalent than cereal grains (in total four grains of barley from the site and three of wheat). It was therefore considered possible that the Knotgrass family seeds were at the site because they were being used as food. The seeds are edible and they have been found in the gut contents of prehistoric bog bodies (Behre 2008, 65). In addition, it seems that some of the larger seeded Knotgrass varieties, such as Black bindweed (many of the

Knotgrass seeds from Mitchelstown 1 were of this type) were used to make flour, similar to buckwheat flour (Renfrew 1973, 182).

Unfortunately, Phase 1 interpretations were based on a sub-sample of the samples that were collected from both sites. In order to interrogate the Phase 1 results further it was felt that more raw data from both sites was required. This involved sieving the remaining, un-processed samples from the sites and thereby increasing the available plant remains data. This was then analysed to determine whether the picture obtained from the initial analysis was a true one. This was the first aim of Phase 2 analysis; to increase the available plant remains data and to determine whether the picture obtained on the basis of Phase 1 plant remains results was true.

Phase 2

A total of 129 samples from Ballynamona 2 and 99 samples from Mitchelstown 1 were processed as part of Phase 2, significantly increasing the number of samples examined from both sites (see Table 1). However, charred seeds were absent from many samples, and therefore a much smaller quantity of samples actually contributed to the new plant data available from both sites (see Table 2).

Table 1: Sample quantities from Ballynamona 2 & Mitchelstown 1

Site	*No. of samples with (Phase 1)*	*No. of samples (Phase 2)*	*Total no. of samples (Phases 1 + 2 combined)*
Ballynamona 2	105	24	129
Mitchelstown 1	35	64	99

Table 2: Samples with seeds, quantities from Ballynamona 2 & Mitchelstown 1

Site	*No. of samples with seeds (Phase 2)*	*No. of samples with seeds (Phase 2)*	*Total no. of samples with seeds (Phases 1 + 2 combined)*
Ballynamona 2	52	24	76
Mitchelstown 1	28	31	59

Comparative graphs, showing the percentage results from Phases 1 and 2 demonstrate that there was relatively little change in the results from Ballynamona 2 (Figure 1) despite the extra samples that were sieved, but that the extra samples from Mitchelstown 1 (Figure 2) significantly changed the understanding of the plant remains assemblage, and therefore has contributed a great deal to the understanding of plant exploitation at that site.

In general the results from Phases 1 and 2 at Ballynamona 2 were remarkably similar, although Phase 2 samples showed a slightly larger percentage of wheat grains (emmer wheat) and a smaller proportion of indeterminate cereal grains than in Phase 1 samples (Figure 1). This indicates that the Phase 1 plant remains results were already an accurate reflection of the plant remains assemblage from the site. This is probably because the number of seeds in the Phase 1 assemblage was already very high, although at 18,069 it only meets the requirement of 'several thousands' laid down by Van der Veen and Fieller (1982, 297) for representation of total seed populations from a particular context or deposit, rather than from an entire site.

It is likely that the similarities in both phases of analysis is a result of homogeneity across the entire sample at Ballynamona 2, as the plant remains appear to have been charred during a single catastrophic event when grain that was being processed or was in storage. This has resulted in an assemblage that is not only extremely rich, but also unusually uniform, in contrast to plant assemblages from other sites that are often characterised by small collections of waste that is generated by piecemeal processing of crops that are taken from storage when the need arises during the year (Stevens 2003, 61).

The results from Ballynamona 2 contrast sharply with an assemblage such as Mitchelstown 1, where the assemblage appears to have accumulated in a piecemeal, context-by-context fashion. This makes the overall results much more difficult to interpret than those from Ballynamona 2. The Phase 2 samples from Mitchelstown 1 show considerably more variety than in the Phase 1 analysis (Figure 2).

As the graph indicates, Phase 2 results from Mitchelstown 1 have contributed greatly to the interpretation of the plant assemblage from this site, as the amount of seeds analysed during Phase 1 (292) were simply inadequate in order to obtain a clear picture of plant use at the site. Phase 2 has added a further 338 seeds to the results from Mitchelstown 1. The total seed count, at 630 is still nowhere near the order of counts obtained from Ballynamona 2. It may still be an inadequate amount on which to base an interpretation of the plant economy from the site, but it is all there is ever going to be from Mitchelstown 1 as both Phase 1 and 2 analysis of plant remains has been completed, and there are no remaining samples left to sieve from this site.

The combined results from Mitchelstown 1 assemblages examined in Phases 1 and 2 indicate that the seeds recovered are mostly weed seeds (Figure 3), and that seeds from the Knotgrass family are significant in percentage terms. This trend is noticeable from samples across the entire site and from both phases of analysis. However, while Phase 1 analysis led the author to suggest that some of these seeds may have been collected as food, the recovery of cereal items during Phase 2 analysis indicated that this was probably not a correct interpretation of the assemblage. Samples from Phase 2 contained more cereal grains that in Phase 1, and significantly more cereal chaff (Table 3).

Table 3: Cereal and chaff recovery from Mitchelstown 1

	No. of cereal grains recovered (including indeterminate grains)	***No. of cereal chaff items recovered***[2]
Phase 1	11	0.5
Phase 2	16	38

[2] For the purposes of these tables, 1 item equals a spikelet fork or a rachis internode (2 single glume bases are counted as one spikelet fork)

The recovery of chaff from the Phase 2 samples, in particular the recovery of chaff in greater quantities than cereal grains, suggests that some cereal processing occurred at the site. It is reasonable to assume, therefore, that the charred weed seeds recovered from many contexts across the site may also be the charred by-products of crop processing activity at the site. By-products such as chaff (in particular the glumes from primitive wheat such as emmer) are generally more fragile that items such as weeds and cereal grains (Boardman and Jones 1990, 5), and it is not unusual for them to be destroyed if exposed to fire. However, the paucity of grains, and the complete absence of chaff from samples examined in Phase 1, was unusual. The Phase 2 results have corrected this bias, and although the percentage of weed seeds is still very high in comparison to cereal items, the presence of chaff and some extra weed seeds indicates that the weeds are unlikely to be a collected food source, and more likely to be the results of piecemeal crop processing activity that was carried out at the site.

The Phase 2 analysis of plant remains from Ballynamona 2 and Mitchelstown 1 has therefore confirmed Phase 1 results from Ballynamona 2, but has led to a significant re-assessment of the results from Mitchelstown 1.

Discussion

Combined results from Phases 1 and 2 of plant remains analysis from Ballynamona 2 and Mitchelstown 1 have clarified the picture with regards to crop exploitation at both sites during the Middle Bronze Age. The results now show that there is significant evidence to suggest that Ballynamona 2 acted as a storage centre for crops of naked barley and emmer wheat, and that this centre burnt in one catastrophic event, destroying the valuable crops that were brought to the site. The results also indicate that a significant amount of off-site crop processing had already been carried out on these grains, removing most of the weeds and the chaff associated with the crop. There is no evidence to suggest where this processing was carried out; the crops must have been brought to the site already processed and prepared for storage. The rubbing and quern stones found during the excavation suggest that grinding and processing into flour was also an important function of the site before the crops were burnt and destroyed.

Mitchelstown 1 plant remains can now be interpreted as the by-products of crop processing, indicating that cleaning the grain to remove chaff and weeds did occur at this site. The evidence suggests that this may have occurred piecemeal, as the residues and by-products were scattered in contexts across the site. Therefore, the results from this site represent a certain amount of 'background noise', traces of plant processing activities that were carried out at the site, with the residues then re-deposited within contexts at the site through sweeping, trampling, etc. and the actions of the wind and rain (Fuller and Stevens 2009, 39). Unlike Ballynamona 2, there is no evidence to indicate that the Mitchelstown 1 assemblage represents a single event, it could just as easily have represented repeated events, where stored, un-cleaned crops were taken out and processed when the need arose.

The results from the plant remains indicate that despite the superficial similarities between Ballynamona 2 and Mitchelstown 1 (Middle Bronze Age sites with multiple round houses) the plant economies of each site are remarkable different. While Mitchelstown 1 appears to have been a site where subsistence-based activities such as piecemeal crop processing were carried out, Ballynamona 2 appears much richer, a place where fully cleaned crops were taken for storage and for grinding into flour.

Any harvest is a period of bottleneck in terms of labour; in subsistence economies the entire family is mobilised to optimise the returns on the crop and to ensure that the greatest quantity possible is placed into storage for the impending winter. Under such circumstances there is no time to engage in crop processing and crops are generally stored with most of the weeds and some chaff intact. In these circumstances the grain is taken from storage and processed or cleaned as an when it is necessary (Fuller and Stevens 2009,

41). The evidence from Mitchelstown 1 strongly suggests that this is the sort of economy and lifestyle that the inhabitants of the site followed during the Middle Bronze Age.

Meanwhile, the evidence for the storage of a fully cleaned crop at Ballynamona 2 suggests an entirely different scenario. Firstly, the evidence of a large surplus crop that was stored at the site indicates wealth. Secondly, the fact that the crop was fully cleaned indicates an ability to mobilise a work-force above and beyond the immediate needs of the harvest (crop processing was also attended to) and this in turn suggests a unit that was larger and more complex than a nuclear family.

Based on the plant remains assemblages it therefore appears that the settlement at Mitchelstown 1 was one where cereal food harvesting and consumption were organised in a manner in keeping with the activities of a nuclear family. The much higher labour costs involved in storing large quantities of fully cleaned crops identified at Ballynamona 2 indicates that the organisation of this site was more complex (Fuller and Stevens 2009, 41). The archaeobotanical remains from both of there sites, compared and contrasted to one another, therefore each shed very different lights on the economy and the social structure of the Middle Bronze Age in north Cork. To what extent do these differences reflect the locations of each site and the relative productivity of the surrounding land? It is difficult to say. In general, the land in the area is fertile, good farmland, and it seems unlikely that the 3 km distance between the sites could afford either site a relative advantage over the other in terms of productivity. Other factors, such as extent of land holdings, could of course affect the resources at the disposal of any given settlement. It is tempting to speculate that Mitchelstown 1, settled early in the Middle Bronze Age, may be a window on the earlier part of the period, one unaffected as yet by growing social complexity. Ballynamona 2, where radiocarbon dates indicate a possible overlap with settlement at Mitchelstown 1, but where, more likely the settlement occurred some generations later (perhaps as much as 200 years after the settlement at Mitchelstown 1 had been abandoned), tells a much different story of a complex, hierarchical society, where surplus crops and labour were gathered in one place, and are therefore suggestive of the gathering of tribute by social elites.

In general the results from these two sites indicate how difficult it is to generalise about any period on the basis of results from one site; interpretations of economic and social archaeology of the Middle Bronze Age in north Cork based solely on the results from Ballynamona 2 would differ considerably from those based on the results from Mitchelstown 1. Instead the combined results indicate a period where different types of social organisation (in particular the social organisation of the harvest) probably co-existed, and suggest that social complexity may have emerged over a relatively short period of two hundred years in north Cork,

although results from more round house sites from the period and within this area, would greatly enhance our understanding of this phenomenon.

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Appendix 1: Identified plant remains from Ballynamona 2 (Phases1 and 2)

Context	**25**	**32**	**39**	**49**	**53**	**55**	**57**	**60**	**139**	**80**	**100**	**258**	**263**	**268**	**275**
Sample	**31**	**39**	**59**	**69**	**72**	**78**	**82**	**85**	**98**	**116**	**141**	**152**	**154**	**157**	**160**
Vol. (litres)									**3**			**1**	**4**		**4**
% sorted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Possible Acorn fragments (cf *Quercus* spp.)															
Hazel nut shell fragments (*Corylus avellana* L.)	1	5	4			7	1	5			4				
Indeterminate seeds from the goosefoot family (Chenopodiaceae)															
Corn Spurrey (*Spergula arvensis* L.)															
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)															
Black bindweed (*Fallopia convolvulus* (L.) Á Löve)															
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)															
Indeterminate seeds from the Knotgrass family (Polygonaceae)					1										
Flax seed fragments (*Linum* L. species)															
Plantain *(Plantago* L. species)										1					
Dock/Knotgrass or Sedge seed (Polygonaceae/Cyperaceae)									1						
Possible oat grains (cf *Avena* species)															
Barley grains (*Hordeum vulgare* L.) naked				1						8		1			
Probably naked barley grains (*Hordeum vulgare* L.) Naked grains															
Barley grains (*Hordeum vulgare* L.) hulled															
Possible hulled barley grains (*Hordeum vulgare* L.) hulled grains															
Barley grains (*Hordeum vulgare* L.) indeterminate type						1								2	1
Possible barley grains (cf *Hordeum vulgare)*															
Rachis internodes from indeterminate barley grains (*Hordeum* spp.)															
Emmer wheat (*Triticum dicoccum* L.) 2 seeded grain		5													
Probable Emmer wheat (*Triticum cf dicoccum* L.) 2 seeded grain															
Emmer wheat (*Triticum cf dicoccum* L.) glume bases															
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume bases															
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork															
Emmer wheat (*Triticum dicoccum* L.) spikelet fork															
Bread wheat rachis internodes (*Triticum aestivum* L.)															
Wheat grains *(Triticum* L. species)															
Barley/Wheat grains (*Hordeum*/*Triticum*)															
Possible wheat grains (cf *Triticum* species)															
Indeterminate cereal grains												1	1	1	1
Indeterminate grass seeds (Poaceae)															
Indeterminate weed seeds															

Identified plant remains from Ballynamona 2 (Phases1 and 2) continued

Context	**111**	**114**	**164**	**153**	**159**	**161**	**166**	**402**	**408**	**527**	**420**	**407**	**410**	**412**	**486**
Sample	**167**	**172**	**254**	**261**	**272**	**280**	**296**	**402**	**405**	**407**	**409**	**412**	**422**	**426**	**435**
Vol. (litres)								**2**	**1**	**0.5**	**3**				**3**
% sorted	100	100	100	100	100	9	100	100	100	100	100	100	100	100	100
Possible Acorn fragments (cf *Quercus* spp.)															
Hazel nut shell fragments (*Corylus avellana* L.)		1		1		1									
Indeterminate seeds from the goosefoot family (Chenopodiaceae)															
Corn Spurrey (*Spergula arvensis* L.)															
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)															
Black bindweed (*Fallopia convolvulus* (L.) Á Löve)										1					
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)															
Indeterminate seeds from the Knotgrass family (Polygonaceae)						2				3		1		1	5
Flax seed fragments (*Linum* L. species)															
Plantain *(Plantago* L. species)															
Dock/Knotgrass or Sedge seed (Polygonaceae/Cyperaceae)															
Possible oat grains (cf *Avena* species)															
Barley grains (*Hordeum vulgare* L.) naked	2				1	498			3	1052		306	2	276	485
Probably naked barley grains (*Hordeum vulgare* L.) Naked grains															
Barley grains (*Hordeum vulgare* L.) hulled															
Possible hulled barley grains (*Hordeum vulgare* L.) hulled grains															
Barley grains (*Hordeum vulgare* L.) indeterminate type			4		1	4	1			58	2		1		29
Possible barley grains (cf *Hordeum vulgare)*															
Rachis internodes from indeterminate barley grains (*Hordeum* spp.)						1									
Emmer wheat (*Triticum dicoccum* L.) 2 seeded grain						15				4					
Probable Emmer wheat (*Triticum cf dicoccum* L.) 2 seeded grain															
Emmer wheat (*Triticum cf dicoccum* L.) glume bases															
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume bases						2									
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork															
Emmer wheat (*Triticum dicoccum* L.) spikelet fork															
Bread wheat rachis internodes (*Triticum aestivum* L.)															
Wheat grains *(Triticum* L. species)															1
Barley/Wheat grains (*Hordeum*/*Triticum*)															
Possible wheat grains (cf *Triticum* species)															
Indeterminate cereal grains			2			52	1	1	2	125	4	17		10	79
Indeterminate grass seeds (Poaceae)										1	1				
Indeterminate weed seeds												5	1		1

Identified plant remains from Ballynamona 2 (Phases1 and 2) continued

Context	**417**	**416**	**473**	**419**	**521**	**420**	**527**	**501**	**502**	**503**	**526**	**494**	**428**	**536**	**537**
Sample	**436**	**438**	**442**	**444**	**448**	**448**	**449**	**450**	**451**	**452**	**455**	**460**	**468**	**471**	**472**
Vol. (litres)			**4**		**3**		**3**	**4**	**2**	**3**	**1**	**1**		**3**	**4**
% sorted	100	100	100	100	50	100	100	100	100	100	100	100	100	100	100
Possible Acorn fragments (cf *Quercus* spp.)															
Hazel nut shell fragments (*Corylus avellana* L.)						2							12		
Indeterminate seeds from the goosefoot family (Chenopodiaceae)							3								
Corn Spurrey (*Spergula arvensis* L.)									1	1					
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)														1	
Black bindweed (*Fallopia convolvulus* (L.) Á Löve)							3	1	1					2	
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)															
Indeterminate seeds from the Knotgrass family (Polygonaceae)					14		4	2	3					8	5
Flax seed fragments (*Linum* L. species)							2	10							
Plantain *(Plantago* L. species)															
Dock/Knotgrass or Sedge seed (Polygonaceae/Cyperaceae)															
Possible oat grains (cf *Avena* species)															
Barley grains (*Hordeum vulgare* L.) naked		1	2	1	7300		2502	1428	368	246		27		1359	546
Probably naked barley grains (*Hordeum vulgare* L.) Naked grains															
Barley grains (*Hordeum vulgare* L.) hulled															
Possible hulled barley grains (*Hordeum vulgare* L.) hulled grains															
Barley grains (*Hordeum vulgare* L.) indeterminate type	11				344	2	147	92	19	2	1				
Possible barley grains (cf *Hordeum vulgare)*															
Rachis internodes from indeterminate barley grains (*Hordeum* spp.)															
Emmer wheat (*Triticum dicoccum* L.) 2 seeded grain					1		9							1115	
Probable Emmer wheat (*Triticum cf dicoccum* L.) 2 seeded grain							7	13	3						3279
Emmer wheat (*Triticum cf dicoccum* L.) glume bases															
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume bases					2		1	8	3	15				92	866
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork								1		1				34	120
Emmer wheat (*Triticum dicoccum* L.) spikelet fork														6	63
Bread wheat rachis internodes (*Triticum aestivum* L.)															
Wheat grains *(Triticum* L. species)								45			1				
Barley/Wheat grains (*Hordeum*/*Triticum*)															
Possible wheat grains (cf *Triticum* species)										3					
Indeterminate cereal grains	7				364		376	252	84	30	1			537	
Indeterminate grass seeds (Poaceae)						1									
Indeterminate weed seeds								1						3	

Identified plant remains from Ballynamona 2 (Phases1 and 2) continued

Context	**538**	**520**	**436**	**590**	**546**	**556**	**434**	**435**	**403**	**577**	**458**	**450**	**452**	**454**	**474**
Sample	**473**	**473**	**474**	**474**	**478**	**481**	**483**	**486**	**486**	**489**	**490**	**501**	**503**	**508**	**510**
Vol. (litres)	**2**			**3**	**2**	**1**				**1**					
% sorted	100	100	100	100	100	100	100	100	50	100	100	66	100	100	100
Possible Acorn fragments (cf *Quercus* spp.)				7											8
Hazel nut shell fragments (*Corylus avellana* L.)															
Indeterminate seeds from the goosefoot family (Chenopodiaceae)														1	
Corn Spurrey (*Spergula arvensis* L.)															
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)	2														
Black bindweed (*Fallopia convolvulus* (L.) Á Löve)	1			1											
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)															
Indeterminate seeds from the Knotgrass family (Polygonaceae)	3	1	1	1			1		3			5		2	
Flax seed fragments (*Linum* L. species)				103								3		139	48
Plantain *(Plantago* L. species)															
Dock/Knotgrass or Sedge seed (Polygonaceae/Cyperaceae)															
Possible oat grains (cf *Avena* species)												1			
Barley grains (*Hordeum vulgare* L.) naked	51		240	22	23	3	24	336	1279	5	3	1900	123	111	
Probably naked barley grains (*Hordeum vulgare* L.) Naked grains		67							120			315			63
Barley grains (*Hordeum vulgare* L.) hulled	26														
Possible hulled barley grains (*Hordeum vulgare* L.) hulled grains												1			
Barley grains (*Hordeum vulgare* L.) indeterminate type	91		50	26	13		1		2	3	1	204	67	7	2
Possible barley grains (cf *Hordeum vulgare)*						1									
Rachis internodes from indeterminate barley grains (*Hordeum* spp.)															
Emmer wheat (*Triticum dicoccum* L.) 2 seeded grain		14	2			1						119	4	5	10
Probable Emmer wheat (*Triticum cf dicoccum* L.) 2 seeded grain	1671			5							3				
Emmer wheat (*Triticum cf dicoccum* L.) glume bases															1
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume bases	63			4						3	7	4		2	
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork	3											2			
Emmer wheat (*Triticum dicoccum* L.) spikelet fork	9			2											2
Bread wheat rachis internodes (*Triticum aestivum* L.)	1														
Wheat grains *(Triticum* L. species)															
Barley/Wheat grains (*Hordeum*/*Triticum*)															
Possible wheat grains (cf *Triticum* species)															
Indeterminate cereal grains	211	16	31	14	12	7	1	39		3		316	52	82	24
Indeterminate grass seeds (Poaceae)	1											1		7	
Indeterminate weed seeds	2			4			1	5				1	1	4	2

Identified plant remains from Ballynamona 2 (Phases1 and 2) continued

Context	**499**	**444**	**447**	**448**	**449**	**465**	**473**	**468**	**469**	**490**	**475**	**476**	**515**	**487**	**508**	**519**
Sample	**513**	**519**	**520**	**521**	**527**	**531**	**538**	**542**	**573**	**578**	**580**	**582**	**584**	**585**	**626**	**656**
Vol. (litres)																
% sorted	100	100	100	100	100	100	14	100	100	100	100	100	50	100	100	100
Possible Acorn fragments (cf *Quercus* spp.)																
Hazel nut shell fragments (*Corylus avellana* L.)									2							
Indeterminate seeds from the goosefoot family (Chenopodiaceae)	1												3			
Corn Spurrey (*Spergula arvensis* L.)																
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)																
Black bindweed (*Fallopia convolvulus* (L.) Á Löve)																
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)			1													
Indeterminate seeds from the Knotgrass family (Polygonaceae)			1	1			1		1			1	2			
Flax seed fragments (*Linum* L. species)	2				1	1										
Plantain *(Plantago* L. species)																
Dock/Knotgrass or Sedge seed (Polygonaceae/Cyperaceae)																
Possible oat grains (cf *Avena* species)																
Barley grains (*Hordeum vulgare* L.) naked	4	3	3353	880	110			4				7	173	44		
Probably naked barley grains (*Hordeum vulgare* L.) Naked grains							176			2			51	126		
Barley grains (*Hordeum vulgare* L.) hulled							17									
Possible hulled barley grains (*Hordeum vulgare* L.) hulled grains														1		
Barley grains (*Hordeum vulgare* L.) indeterminate type	4		1	150	150	4	170		6		6	14	209	70		1
Possible barley grains (cf *Hordeum vulgare)*																
Rachis internodes from indeterminate barley grains (*Hordeum* spp.)																
Emmer wheat (*Triticum dicoccum* L.) 2 seeded grain					5		2054						780	90		
Probable Emmer wheat (*Triticum cf dicoccum* L.) 2 seeded grain				2										7		
Emmer wheat (*Triticum cf dicoccum* L.) glume bases							408						100			
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume bases									1				6			
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork													4			
Emmer wheat (*Triticum dicoccum* L.) spikelet fork							96			1			49	1		
Bread wheat rachis internodes (*Triticum aestivum* L.)																
Wheat grains *(Triticum* L. species)	3											5	27	2		
Barley/Wheat grains (*Hordeum*/*Triticum*)						1										
Possible wheat grains (cf *Triticum* species)									24							
Indeterminate cereal grains			12	181	45	1	320		21			20	509	187	1	
Indeterminate grass seeds (Poaceae)			8	5									5	1		
Indeterminate weed seeds				2				1		1		2		1		

Appendix 2: Identified plant remains from Mitchelstown 1 (Phases1 and 2)

Context	**14**	**22**	**32**	**16**	**4**	**58**	**15**	**54**	**70**	**85**	**8**
Sample	**7**	**9**	**14**	**18**	**20**	**21**	**27**	**31**	**39**	**47**	**50**
Volume											
Seeds per litre											
Hazel nut shell fragments (*Corylus avellana* L.)					1	1				2	
Indeterminate nut shell fragment										2	
Chickweed (*Chenopodium album*)				1							
Indeterminate seeds from the goosefoot family (Chenopodiaceae)				1							
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)				1		**2**		2			1
Balck bindweed (*Fallopia convolvulus* (L.) Á Löve)	1		1	11	2	1	1				1
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)			1	1	1	2		2			
Indeterminate seeds from the Knotgrass family (Polygonaceae)				45	12	13		16			14
Cleavers (*Galium aparine*)					1						
Barley grains (*Hordeum vulgare* L.) indeterminate type									1		
Emmer/Spelt Wheat glume bases (*Triticum dicoccum/spelta*)									1		
Apical end from Wheat grains of indeterminate type (*Triticum* species)											1
Possible Wheat grain (cf *Triticum* species)					1						
Barley/Wheat grains (*Hordeum/Triticum*)								1			
Indeterminate cereal grains		1			1						
Indeterminate grass seeds (Poaceae)			1								
Indeterminate weed seeds		1		6				4			1

Identified plant remains from Mitchelstown 1 (Phases1 and 2) continued

Context	**253**	**371**	**374**	**398**	**414**	**423**	**494**	**514**	**537**	**12**	**29**
Sample	**86**	**100**	**103**	**110**	**119**	**121**	**137**	**144**	**151**	**4**	**13**
Volume										2	1
Seeds per litre										0.222	0.1
Balck bindweed (*Fallopia convolvulus* (L.) Á Löve)		1									1
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)						1					
Indeterminate seeds from the Knotgrass family (Polygonaceae)	1	69	8		2		3	39		5	7
Plantain *(Plantago* L. species)										1	
Barley grains (*Hordeum vulgare* L.) hulled				3							
Barley grains (*Hordeum vulgare* L.) indeterminate type											1
Barley/Wheat grains (*Hordeum/Triticum*)		1									
Indeterminate cereal grains									1		
Fragments of indeterminate cereal grains (Ceralia)				1							
Indeterminate grass seeds (Poaceae)				1							
Indeterminate weed seeds				1						3	1

Identified plant remains from Mitchelstown 1 (Phases1 and 2) continued

Context	**41**	**2**	**51**	**64**	**126**	**139**	**136**	**162**	**201**	**304**	**363**
Sample	**24**	**26**	**29**	**38**	**54**	**60**	**65**	**67**	**73**	**87**	**90**
Volume	2	8	6	2	5	0.5	1	0.5	2	0.5	5
Seeds per litre	0.143	2	1.2	0.2	0.5	0.5	0.03	0.5	0.667	0.5	0.625
Hazel nut shell fragments (*Corylus avellana* L.)		1									
Indeterminate seeds from the goosefoot family (Chenopodiaceae)	1								1		
Corn Spurrey (*Spergula arvensis* L.)	1			1							
Balck bindweed (*Fallopia convolvulus* (L.) Á Löve)		1			2		1				
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)											
Indeterminate seeds from the Knotgrass family (Polygonaceae)	4		1	4	1	1	4			1	6
Indeterminate daisy family seeds: Picris type (Asteraceae)	1										
Barley grains of indeterminate species (*Hordeum* species)								1			
Barley rachis internodes (indeterminate type)				1	3		16				
Emmer wheat (*Triticum dicoccum* L.) two seeded grain	1	2		1							
Probable Emmer wheat (*Triticum cf dicoccum* L.) two seeded grain				2							
Probable Emmer wheat (*Triticum cf dicoccum* L.) spikelet fork	1				2		4				
Probable Emmer wheat (*Triticum cf dicoccum* L.) glume base	2						3				1
Indeterminate cereal grains											1
Rachis internodes, possibly from free-threshing cereal					1		5				
Indeterminate grass seeds (Poaceae)			2	1					1		
Indeterminate weed seeds	3		2		1				1		

Identified plant remains from Mitchelstown 1 (Phases1 and 2) continued

Context	**366/367**	**375**	**396**	**393**	**394**	**406**	**431**	**435**	**444**	**448**	**436**
Sample	**97**	**101**	**106**	**113**	**114**	**117**	**122**	**125**	**129**	**130**	**133**
Volume	10	0.75	7	0.75	4	10	0.5	7	2	0.25	0.75
Seeds per litre	1.111	0.15	0.2	0.054	4	0.769	0.5	0.538	0.4	0.25	0.75
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)			4	1							
Balck bindweed (*Fallopia convolvulus* (L.) Á Löve)		3	2	1		2	1				
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)											
Indeterminate seeds from the Knotgrass family (Polygonaceae)	3	2	28	12	1	8		10	2	1	1
Plantain *(Plantago* L. species)						1					
Barley grains (*Hordeum vulgare* L.) hulled			1								
Barley grains (*Hordeum vulgare* L.) indeterminate type									1		
Barley rachis internodes (indeterminate type)								2			
Emmer wheat (*Triticum dicoccum* L.) two seeded grain								1			
Indeterminate cereal grains	1										
Indeterminate grass seeds (Poaceae)	2								1		
Indeterminate weed seeds	3					2			1		

Identified plant remains from Mitchelstown 1 (Phases1 and 2) continued

Context	**503**	**420**	**524**	**530**	**534**	**551**	**578**	**436**
Sample	**140**	**143**	**147**	**148**	**150**	**153**	**161**	**120/126?**
Volume	2	2	2	5	2	10	7	2
Seeds per litre	0.118	0.667	0.25	0.081	0.133	0.667	1.75	0.2
Hazel nut shell fragments (*Corylus avellana* L.)					1			
Corn Spurrey (*Spergula arvensis* L.)				2				
Pale persicaria (*Persicaria lapathifolia* (L.) Gray)		1					1	
Balck bindweed (*Fallopia convolvulus* (L.) Á Löve)				3				2
Probable Sheep's sorrel (*Rumex* cf *acetosella* L.)								6
Indeterminate seeds from the Knotgrass family (Polygonaceae)	15	2	8	50	13	15	3	
Plantain *(Plantago* L. species)				1				
Indeterminate cereal grains					1			2
Indeterminate weed seeds	2			6				

Figure 1: Comparison between percentage results from Phases 1 & 2 at Ballynamona 2

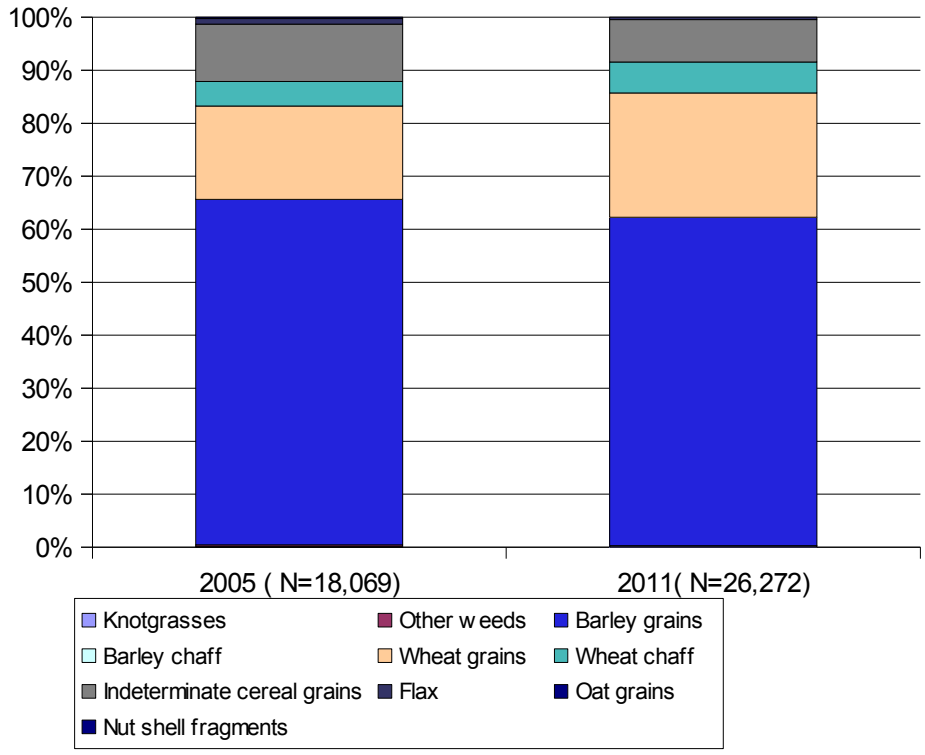

Figure 2: Comparison between percentage results from 2005 and 2001 at Mitchelstown 1

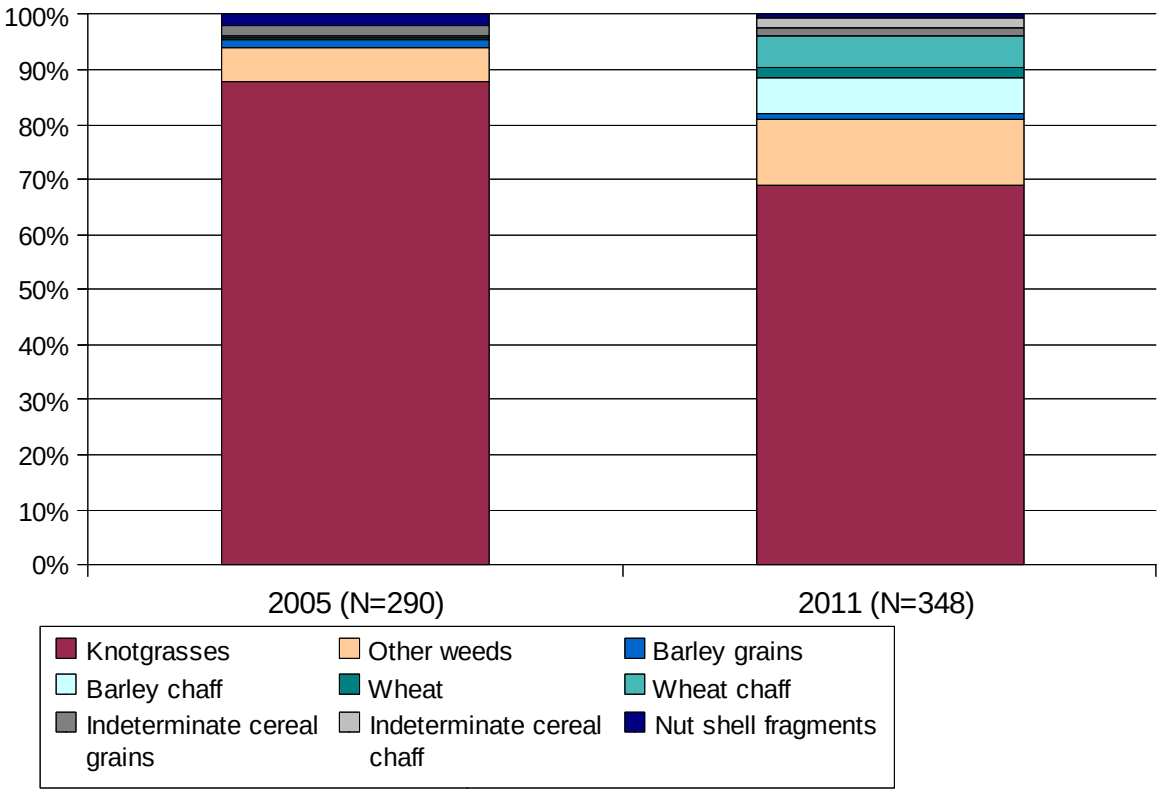

Figure 3: Simplified percentage cereal graph of the plant assemblage from Mitchelstown 1