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ABSTRACT: A method of selecting samples on site for plant remains is discussed. With large sites, where it is not always possible to sample every feature, a programme of random sampling is advised in order to collect data representative of the site as a whole. The practical application of the method is discussed, as is the selection of extra, so-called judgement samples.
KEYWORDS: on-site sampling, random sampling, archaeobotany, seeds, carbonised plant remains, judgement samples, representativeness.

1 INTRODUCTION

One of the most crucial problems all archaeobotanists will have to consider during the analysis and interpretation of their material, is that of the representativeness of their data. Although one can frequently spend a lot of time interpreting the plant remains from single features, the aim is ultimately to reconstruct the function of a site as a whole, and its relationship with other sites in the region. In order to reconstruct the function of the site as a whole, as against the reconstruction of specific features, we should ideally study the total population of plant remains present on site. As it is impossible to sieve/float all sediments in toto, the archaeobotanist generally relies on samples. The way those samples are selected on site will influence every later phase of the analysis and interpretation. A method of selecting samples on site, aimed at retrieving data representative of the entire site, is suggested in this paper.

2 SAMPLING

Ideally samples are taken from every feature or context. While this may be feasible on small sites, the practical problems are enormous on larger sites, as this would generate many more samples than the archaeobotanist could ever look at. As a result, on larger sites the sampling is frequently left to the wisdom of the archaeologist, which can result in a situation where samples are only taken from rich, ashy deposits; or only on sunny, quiet days; or in the week immediately before the archaeobotanist is known to come for a site visit. Evidently samples taken in this way cannot be regarded as truly representative of all plant remains on site: while rich deposits should certainly not be ignored, it should be realised that they are rarely representative of a site; most sites have many more non-rich deposits.

To avoid human biases in the sampling of large sites a programme of random sampling should be applied, whereby the word "random" is used here in the statistical sense, i.e. giving every feature an equal chance of being selected for sampling. The method was developed by Martin Jones and first applied on a series of Iron Age and Romano-British settlement sites in the Upper Thames valley (Jones 1978a). To explain how this programme of random sampling works, the late Iron Age site Thorpe Thewles in Cleveland is here taken as a case study.

3 THORPE THEWLES – A CASE STUDY

Thorpe Thewles is a late Iron Age settlement site in Cleveland, north-east England (fig.2). The site is situated on the boulder clay foothills of the south Durham plateau and occupies the summit of a gentle hill. Aerial photographs revealed a crop mark site consisting of a large (0.7 hectare) sub-rectangular enclosure with a central house. The site was excavated during 1980 – 1982 by the Cleveland County Archaeology Unit, under the direction of Dave Heslop. In total just under 6000 square metres were excavated.

As the site plan shows (fig.3), the excavations have pointed to the existence of occupation phases both before and after the main occupation phase, which is represented by a sub-rectangular bank-and-ditch enclosure. This main enclosure phase dates from the 3rd or the 2nd century B.C. During the 1st century B.C. and the 1st century A.D. the bank and ditch were levelled and the settlement expanded beyond the original enclosure. During this phase a small amount of imported Roman pottery (Samian) found its way to the site. The settlement is not thought to have continued after the 1st century A.D.

The aim of the programme of random sampling for plant remains on the Thorpe Thewles site was to collect a body of data representative of the site as a whole. In addition, by applying this method, the material would be directly comparable to other sites sampled in this way (i.e. those in the Upper Thames valley, Jones 1978a, 1978b, forthcoming), and to sites in the region that will be excavated in the future. This will greatly improve our study of the development of crop production in the North of England and facilitate comparison with developments in the south of the country.

4 PROCEDURE

4.1 Linear features and point features

The first season of excavations at Thorpe Thewles had shown that the subsoil features fell into two categories (see fig.3): linear features, i.e. ditches and gullies, and point features, i.e. pits and postholes. Contexts like hearths and floors were rarely present due to plough damage. A random sample of 10% was taken from both categories of contexts, using a table of random numbers with a running total.

The procedure adopted for the linear features was to take a 10% sample from their total length. In other words, the length of each individual linear feature was measured and combined on an imaginary line, see fig. 1. 10% random sample points (in metres) wereplotted on this line and these indicated the pointswhere the linear features were to be sectioned. A metre of the feature would be excavated and the sample taken from the section.

The point features were sampled individually. They were numbered in sequence and 10% of them, chosen with the help of a table of random numbers, were excavated and sampled.

Linear and point features are very common on crop mark sites. However, other categories can easily be defined to suit other sites: hearths, floors etc. If no information is available about the site beforehand, a random sample out of the total number of features could be taken. If, however, the information is available, it should be used in order to improve the quality of the sample obtained. By stratifying the sample into archaeologically recognisable categories (i.e. ditches, pits etc.), a representative sample of all features will be guaranteed.

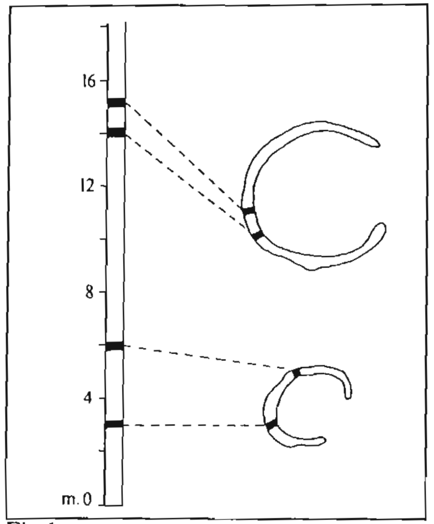


Fig.1

4.2 Judgement samples

The programme of random sampling produced a collection of samples representative of the site as a whole. However, in addition to the objective, random strategy, a 'human' subjective one was carried out as well, in that the excavator could choose extra samples, in addition to the random ones, whereby his choice could be entirely directed by subjective criteria, like the occurrence of rich, ashy deposits or the apparent gaps left by the random sampling strategy. These samples were numbered separately and were named 'judgement' samples.

The distribution of the three categories of samples: ◆ samples from linear features, ● samples from point features (both randomly chosen), and ■ judgement samples, is shown in fig.4.

Each sample was two buckets of sediment in volume (ca. 28 litres). The total number of samples is: 64 linear samples, 9 point samples and 28 judgement samples.

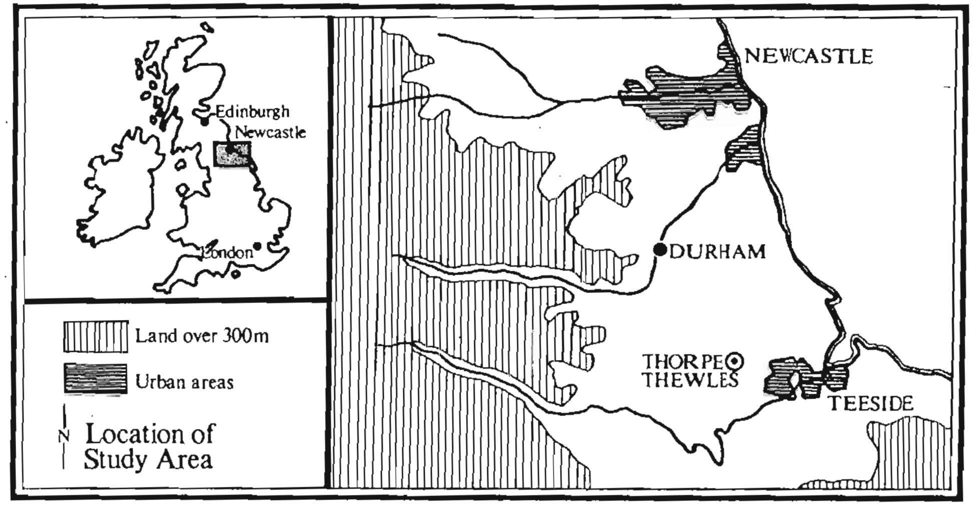


Fig.2

5. RESULTS

The plant remains were analysed from all three types of samples and the results are presented in triangular diagrams (fig.5,6,7). The composition of the samples is grouped into three categories: cereals, chaff and weeds. Their relative proportions were calculated and plotted on the diagrams, whereby each circle represents one sample, and the diameter of the circle represents the number of fragments in one litre of sediment. The analysis is still in progress, so only those samples analysed so far are plotted on the diagrams.

As will be apparent from the diagrams, the results from the three groups of samples are remarkably similar. The proportion of cereals is consistently low, generally below 20% and rarely above 30%. The proportion of chaff is generally below 50% and rarely above 60%, while the weeds are normally dominant, generally above 40% and frequently above 60%.

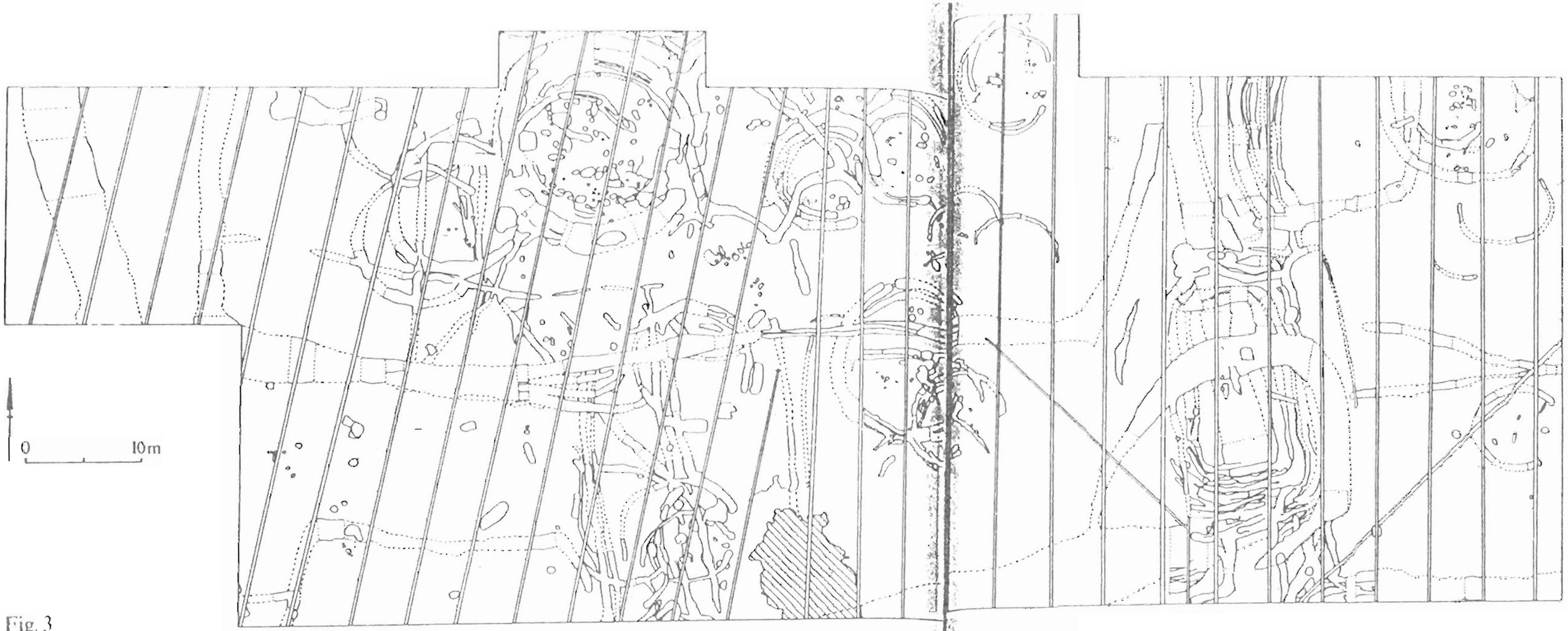
When we compare the results of the random samples with those of the judgement samples, the similarity in the proportions of cereals, chaff and weeds is striking. The main difference lies in the fact that the quantity of seeds in the judgement samples is greater than in the random samples, which corroborates the point made earlier that excavators tend to go for rich, ashy deposits. The average number of seeds in the linear samples is 135, in point samples 129, and in judgement samples 416.

The fact that the judgement samples show roughly the same results as the random samples can perhaps be explained by the fact that on this particular site all features contain more or less the same categories of plant remains; there are no marked differences in the composition of the samples across the site. Every deposit contains few cereals, and slightly more weeds than chaff. Within the weed category the grasses are consistently the dominant class. A detailed discussion of the results of the analysis is forthcoming (Van der Veen, forthcoming).

6. POST-SCRIPT

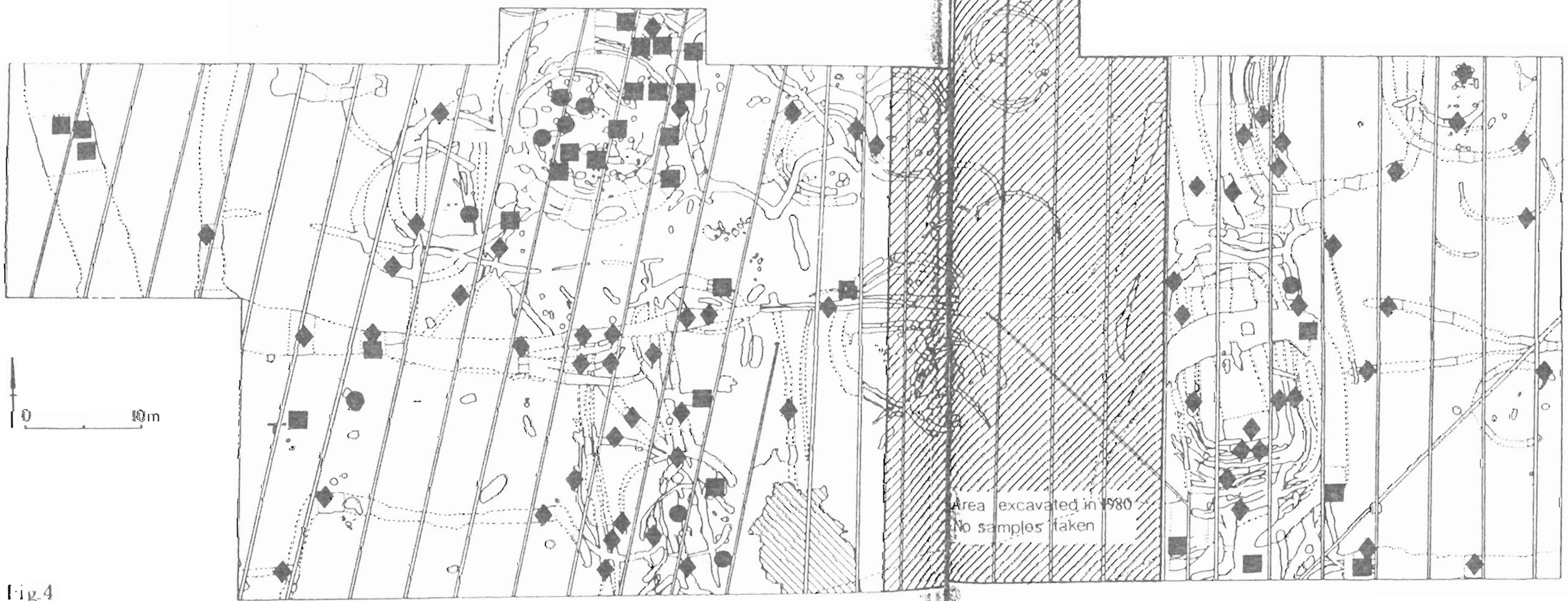
The application of a random sampling strategy on large sites is the only guarantee of obtaining a representative body of data. It is a method easily applied and causes very little disruption of the day to day excavation routine. It provides an objective unbiased collection of data. However, a random sampling strategy does not expect or ask the excavator to ignore and shovel onto the spoilheap a pit ful of carbonised grain. Such features can always be sampled in addition to the randomly selected samples, as long as they are clearly recorded as judgement samples. Thus the random sampling strategy is rigid in that it applies strictly objective criteria in the selection of samples, giving every feature an equal chance of being selected, but is not rigid in the sense that it prevents the sampling of extra, special features.

The most important aspect of the method, is that the technique can be applied on any site, which will greatly enhance the possibility of comparing results from different



THORPE THEWLES 1980-1982
Simplified site plan

Fig. 3



THORPE THEWLES 1980-1982

Fig. 4

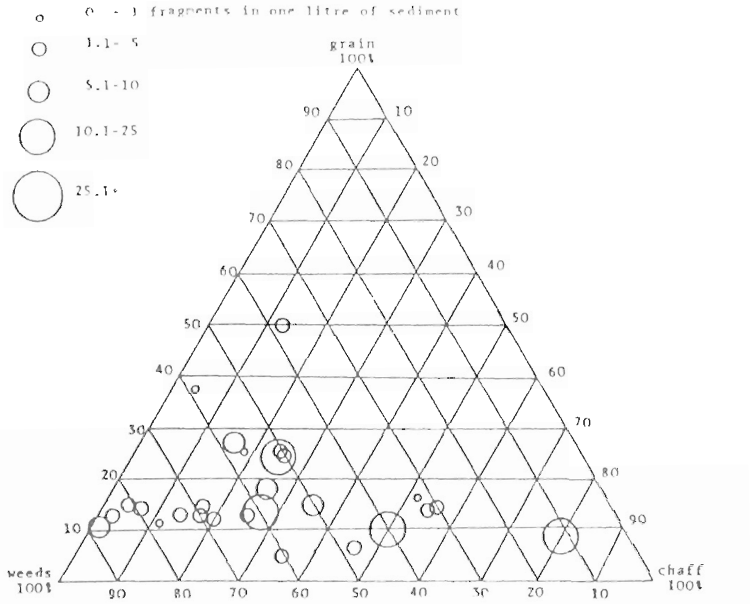


Fig.5 Triangular diagram showing the relative proportions of cereals, chaff and weeds for linear feature samples◆ . Each circle represents one sample.

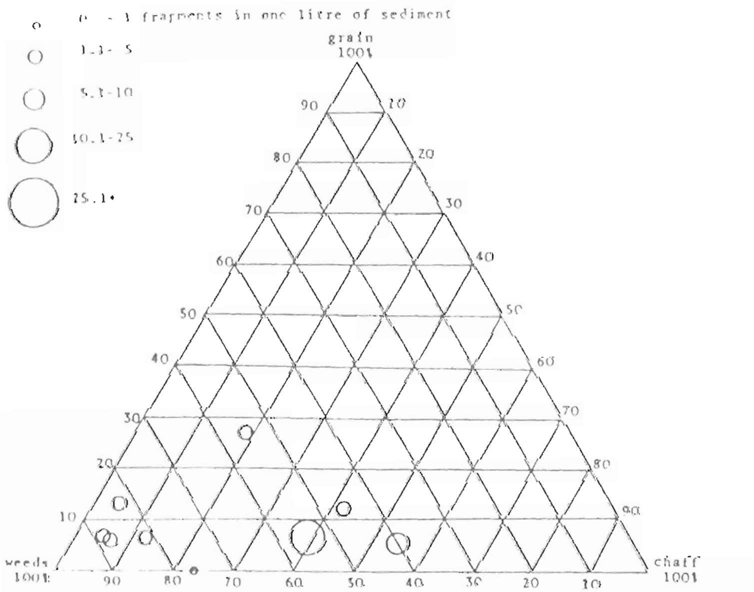


Fig.6 Triangular diagram showing the relative proportions of cereals, chaff and weeds for point feature samples● .
Each circle represents one sample.

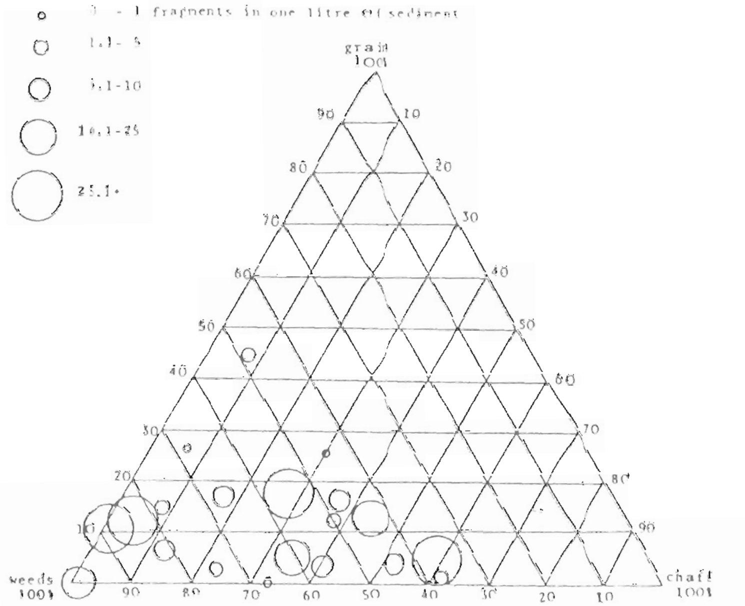


Fig.7 Triangular diagram showing the relative proportions of cereals, chaff and weeds for judgement samples■.
Each circle represents one sample.

sites, excavated by different excavators (for an example of this: Jones, forthcoming). By random sampling one produces a body of data directly comparable to data from other sites, provided that they were also randomly sampled. This will greatly improve our chances of interpreting the economic/arable function of the site and its relationship with other sites in the region, which is one of the main aims of archaeobotany.

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