A consideration of garden hunting by Iron Age farmers in the Limpopo Valley and surrounding regions of southern Africa

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Animals are often attracted to the cultivated gardens of farmers, who would hunt these pests to protect their crops from damage. This is known as garden hunting. Since the concept of garden hunting was first described more than three decades ago, a number of anthropological studies have been undertaken in different parts of the world on hunting practices of farmers in their fields. Ethnographies from southern Africa also indicate that Bantu-speaking farmers spend a considerable amount of time and energy protecting their gardens from small, medium and even large animals. Archaeologists have also applied the concept of garden hunting to faunal samples in various parts of the world, but not yet in southern Africa. In an effort to highlight the potential archaeological significance of garden hunting in Africa, we investigate faunas from the Limpopo Valley and surrounding regions. While we could not find any conclusive evidence for garden hunting, based on circumstantial evidence we nonetheless suggest that it must have been a regular activity.

Keywords: Garden Hunting, Game Index, Limpopo Valley, Iron Age Farmers.

INTRODUCTION

Ethnographic and archaeological studies of Bantu-speaking farmers from southern Africa are often heavily biased towards livestock practices (e.g., Schapera, 1953; Huffman, 2007; Badenhorst, 2011). This is hardly surprising, considering the pivotal role of cattle to Iron Age farmers over the last few centuries (e.g., Badenhorst, 2011), and the decline of game after the introduction of guns and horses at the same time (*cf.* Bruwer, 1956). Hunting, although commonly mentioned in ethnographies of Bantu-speaking farmers from southern Africa, is often not well investigated at Iron Age farmer sites in southern Africa (but see Badenhorst, 2015). One aspect that has not received any attention, at least in Iron Age archaeological studies from southern Africa, is garden hunting. In this paper, we consider this aspect in relation to some examples from Bantu-speaking groups in South Africa, and illustrate the potential of applying the concept of garden hunting to Iron Age faunal samples from the Limpopo Valley and sites from the surrounding region.

Bantu-speaking farmers have been present in southern Africa since the earlier part of the first millennium AD (e.g., Mitchell, 2002). These farmers practised horticulture by cultivating plants and keeping livestock (Badenhorst, 2010). However, some Iron Age sites only have evidence for wild animals (Plug, 1988) and the possibility cannot be excluded that some groups were not farmers at all (Badenhorst, 2010). Indeed, most faunal samples from Iron Age sites in the region contain remains of wild animals to some extent (e.g., Plug and Voigt, 1985; Plug, 2000; Plug and Badenhorst, 2001), indicating an enduring role for non-domesticates even within putative 'farmer' societies.

GARDEN HUNTING

Garden hunting is a concept that was first conceived by the anthropologist Linarus (1976). In short, garden hunting involves farmers hunting game attracted to crops in their fields*, consisting usually, but not exclusively, of small game such as rodents and hares. Since then, anthropologists have studied garden hunting in various parts of the world such as Panama (Smith, 2005), Peru (Naughton-Treves *et al.*, 2003) and Ecuador (Hames and Vickers, 1982).

There are many reasons why farmers hunt pests

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*We use a broad definition of 'hunting' here that includes trapping, snaring, gathering and scavenging of animals as well as more traditional ideas of hunting (e.g., bow and arrow). 'Pests' are defined as vermin.

and small animals in their gardens. Some of the more important reasons include: large game have been depleted around villages, so adding small animal protein to the diet is an optimizing strategy; the time spent looking after gardens makes it difficult to schedule longer hunting trips in search of larger game; small game usually reproduce rapidly which enables a high predation rate; and killing small game reduces the damage these animals cause to crops (Driver and Badenhorst, in press). However, from various anthropological studies, it is also evident that it is not only small game that are attracted to fields (e.g., Fiedler, 1990). Other groups of larger animals hunted in gardens include herbivores such as antelopes and cervids, as well as pigs, primates and birds (Linarus, 1976; Hames and Vickers, 1982; Naughton-Treves *et al.*, 2003; Smith, 2005). Next we provide a sample from ethnographies of Bantu-speaking farmers from South Africa about garden hunting and pests.

EXAMPLES OF GARDEN HUNTING IN SOUTH AFRICA

Various Bantu-speaking groups live in South Africa and have been subjected to anthropological investigations, especially during the last century (e.g., summaries in Schapera, 1953; Bruwer, 1956; Hammond-Tooke, 1974). Our aim is not to provide an exhaustive ethnography of garden hunting practices amongst Bantu-speaking famers of southern Africa, but rather to highlight a few common trends related to garden hunting and farming structures. Historically, the most important cultivated plants would have been sorghum and millet, but in more recent times they have been replaced by maize. The two other most common plants cultivated in South Africa by most farming groups were pumpkins and a variety of gourds. Other plants cultivated include a variety of beans, sweet potatoes, groundnuts and, more recently, tobacco (Shaw, 1974: 92). Sources also indicate that different members of the community usually had clearly demarcated roles within the farming/hunting structure. For example, from the ethnographies, it is evident that women did most of the planting, caring and harvesting of cultivated plants across the region.

Among many groups, such as the Kgatla of south-eastern Botswana, children often assisted women with weeding in fields, but their main task was usually to scare birds away when grain crops begin to seed in April and May (e.g., Schapera, 1939: 163). Other studies found the same sexual division (e.g., Stoffberg 1967: 28; Van Schalkwyk, 1985: 62). Granivorous birds flock to fields in great numbers during this period (Schapera and Goodwin, 1953: 135–136; Krige, 1957: 195; Mönnig, 1967: 161; Krige and Krige, 1980: 32; Kriel and Hartman, 1991: 57), including, for example, large swarms of weaver birds that annually cause considerable damage to sorghum and millet crops (Mönnig, 1967: 161; Van Zyl, 1972: 79).

Raised platforms of small huts were therefore also built in fields, and children spent most of the day shouting, banging tins, throwing stones, or flicking lumps of clay from the end of long sticks to keep birds away (Junod, 1927: 24–25 [Vol II]; Schapera and Goodwin, 1953: 135; Krige, 1957: 195; Bryant, 1967: 302; Mönnig, 1967: 161; Shaw, 1974: 93; Schapera, 1984: 22; Kriel and Hartman, 1991: 57). The Molepo also used sling shots for this purpose (Van Schalkwyk, 1985: 62). Numerous platforms were also built by the Zulu, which were connected by strings. Upon sighting swarms of birds, the watcher would shout and tug the strings causing the maize to move, and the birds to fly away (Krige, 1957: 195). The Tsonga used the same method, but shells of the giant African land-snail were strung on the strings, some as large as a fist (Junod, 1927: 25 [Vol II]). Sometimes scarecrows were made by the Kgatla (Van Zyl, 1972: 79) and the Tsonga (Junod, 1927: 25 [Vol II]).

The Lovedu keep birds, monkeys, rats and mice from fields by trapping or scaring them away. In addition, other precautions are also taken against garden pests, which may include, for example, only planting millet if neighbours do likewise, since when there are many fields, all will be at the mercy of birds. Other precautions include planting bird-proof maize (which is harder to thresh) or early-maturing crops (Krige and Krige, 1980: 39). Lovedu boys also spent a considerable amount of time hunting and trapping birds, cane-rats, squirrels and rabbits (Krige and Krige, 1980: 108), and it is conceivable that many of the these animals were hunted in gardens.

Large game were often caught in pitfall traps by the Shangana-Tsonga and Zulu (e.g., Krige, 1957: 206; Kriel and Hartman, 1991: 56), while smaller antelopes and birds were hunted with clubs, dogs, snares and traps by the Tswana and Pedi (Mönnig, 1967: 176; Schapera, 1984: 24), while amongst the Pedi, boys also used bows and arrows to kill birds (Mönnig, 1967: 176). Lovedu herd-boys used wooden-headed arrows to shoot birds, or birdlime obtained from certain trees to set traps for rats, dwarf mongooses and squirrels (Krige and Krige, 1980: 45). The Zulu often encircled game, and then killed the escaping animals with spears (Krige, 1957: 204). While children of the Kgatla were usually tasked with keeping birds from damaging crops, men were also involved, sometimes going to the fields in the early mornings to scare birds, when women were occupied with household tasks (Van Zyl, 1972: 79). However, men's primary role seems to have been in deterring larger animals, for example

baboons (Krige, 1957: 196; Mönnig, 1967: 161; Coertze, 1971: 81), antelope, including kudu (Stoffberg, 1967: 34), porcupines, hippopotami, (unspecified) wild pigs and elephants, which often strayed into fields at night (Krige, 1957: 196; Quin, 1959: 21).

In addition, gardens needed to be protected from livestock (e.g., Harries, 1929: 59; Kriel and Hartman, 1991: 55), and thus fences were constructed by the Pedi, using thorny bushes or by planting agave aloes or prickly pears on the borders of fields, while herdboys were usually responsible for watching over livestock during the day (Mönnig, 1967: 161; also Quin, 1959: 21). Other groups also constructed fences of thorny bushes, such as the Bantwane (Stoffberg, 1967: 27).

However, by the time most ethnographic studies were recorded, large game had largely disappeared due to the spread of guns, horses and iron traps (e.g., Schapera, 1939: 27, 130; Mönnig, 1967: 174; Stoffberg, 1967: 34; Coertze, 1971: 81; Schapera, 1984: 24). Nevertheless, as this brief overview has shown, different hunting/scaring strategies were still being employed to protect crops in the early to mid-20th century, suggesting that this was a long-established pattern. In the remainder of this paper, we will discuss the archaeological scope and potential of garden hunting, with specific focus on the Iron Age of the Limpopo Valley and surrounding areas.

THE ARCHAEOLOGY OF GARDEN HUNTING

There is no accepted method of investigating garden hunting using archaeological samples. Often, zooarchaeologists may assume garden hunting occurred by the presence of large quantities of diagnostic taxa (e.g., vermin). One of the regions where the concept of garden hunting has been widely applied to archaeofaunal samples is the American Southwest (Driver, 2008). In this arid region, the presence of small game such as cottontails, jackrabbits, rodents, and wild birds in faunal samples is often thought to be the result of garden hunting. These animals were attracted to gardens, and often dominate faunal assemblages from the area (e.g., Emslie, 1981; Shafer, 1991; Hodgetts, 1996; Badenhorst and Driver, 2009).

The single most challenging aspect of applying the garden hunting concept to archaeological fauna is the identification of animals that were definitively hunted in gardens, rather than entering the archaeological record through some other means (Leonard, 1989). For example, the recovery of smaller 'pest' animals in the archaeological record does not automatically indicate deliberate hunting (for food), and may just be the result of vermin extermination and/or the presence of commensal animals. Meanwhile the presence of larger wild animals may simply be the result of 'traditional' rather than garden hunting.

Nevertheless, with these caveats in mind, it is highly conceivable that at least some taxa in faunal samples from Iron Age sites were hunted in gardens, and in the remainder of this paper we intend to examine this idea in relation to the Iron Age of the Limpopo Valley and surroundings of southern Africa. We rely on published faunal data from relevant sites which have been analysed and reported elsewhere (specifically, Plug, 2000; Manyanga *et al.*, 2000; Badenhorst *et al.*, 2011). While the majority of the sites date from the Middle Iron Age (AD 900–1300), some also date to the Early (AD 200–900) and Late (AD 1300–1840) Iron Ages (Huffman, 2007). The intention here is not to examine specific sites, but rather to gain an overall perspective on the potential role of garden hunting during this extended period. We recognize various issues in the individual data-sets that might skew our data, for example multi-component sites that transcend the major chronological phases, as well as varying sampling strategies which might bias recovery. Nevertheless, given our intention to provide a macro-scale perspective, we still believe our results can give valuable insight and act as a platform for future targeted research on garden hunting.

We use two approaches to investigate garden hunting in the Limpopo Valley and surrounding areas (Table 1). First, we calculated the number of taxa identified from each sample and compared it to the total number of identified specimens (NISP) including both wild animals and domesticates. While there are many ways to measure species diversity (Lyman, 2008), the approach followed here is intended to provide a broad sense of relative species diversity. We recognize that species diversity cannot automatically be equated to garden hunting, and rather use this calculation to present an overall sense of the scope and extent of species exploitation. In addition, while it is possible that some small taxa like rodents or land-snails could be natural intrusions at many of these open-air sites, it is also possible that at least some were consumed (e.g., Fiedler, 1990; Badenhorst and Plug, 2012). Nevertheless, the inclusion of these small taxa does not affect our results in any significant manner.

Second, we calculated the Game Index for each sample, which measures the ratio between high- and low-ranked prey (Badenhorst, 2015). High-ranked prey includes all wild Equidae, Bovidae and Suidae, whilst low-ranked prey includes all hares, springhares, hyraxes and wild birds (excluding chickens and ostrich). NISP was used in most cases, but where only MNIs are available, the latter were used. Both NISP and MNI provide similar results for ratio calculations (Fraser and

Table 1
Samples used, their dates, number of taxa, high- and low-ranked prey NISP/MNI, and total NISP of samples (from Plug, 2000; Manyanga *et al.*, 2000; Badenhorst *et al.*, 2011). The sites are listed according to their earliest date of occupation.

Site	Relative date	Number of taxa	High-ranked prey NISP/MNI	Low-ranked prey NISP/MNI	Total NISP of samples	Game Index
Diamant	AD 570–710	26	153/–	1/–	1845	0
Mwenezi	AD 700–1655	31	662/–	33/–	1431	0
Sentinel Ranch	AD 750	10	5/–	0/–	56	0
Schroda	AD 750–900	41	–/85	–/85	19210	0.50
Pont Drift	AD 810–1110	44	–/51	–/56	7403	0.52
Pa8.1	AD 850	6	35/–	0/–	53	0
Commando Kop	AD 850–1000	24	–/33	–/9	3252	0.21
Mapungubwe	AD 950–1250	27	–/60	–/24	4766	0.29
K2	AD 970–1000	42	–/73	–/55	7144	0.43
Malumba	AD 1010–1410	26	36/–	20/–	233	0.36
Stayt (Kon)	AD 1050	14	25/–	16/–	244	0.39
Tavhatshena	AD 1100–1580	31	97/–	12/–	1560	0.11
Map 24	AD 1192–1276	7	1/–	0/–	61	0
Map 23	AD 1223–1265	17	22/–	4/–	306	0.15
2229 AD Sla	AD 1250	23	37/–	27/–	762	0.42
Icon	AD 1330	18	–/10	–/1	636	0.10
Thulamela	AD 1350–1750	72	261/–	165/–	3691	0.39
Map 21	AD 1437–1497	11	4/–	6/–	126	0.6
Map 20	AD 1528–1643	22	10/–	6/–	494	0.38
Map 22	AD 1652–1803	15	7/–	9/–	213	0.56
Tshirululuni	AD 1670–1830	18	27/–	10/–	296	0.27
Dzata	AD 1700	22	45/–	20/–	451	0.31
Hapi Pan	AD 1710	6	25/–	0/–	39	0
Tshitsheme	AD 1740	41	156/–	4/–	1595	0

Badenhorst, 2014). As with diversity measures, the Game Index cannot necessarily be directly equated with evidence for garden hunting, but it may provide an indication of the relative presence of small taxa in samples.

The number of taxa from sites in the Limpopo Valley and surrounding areas was compared to the total NISP for each sample to investigate if some sites have a wider variety of animals than others, which may potentially reveal the regular practice of garden hunting. It is to be expected that samples with either an unusually wide variety, or narrow range of species, may signal garden hunting. This is because a diverse sample may indicate that people made use of additional sources of protein found in their gardens. Alternatively, a narrow diversity may suggest that game were depleted, and people started focusing on certain animals found in gardens. While the results (Fig. 1) are not conclusive, they do indicate a few interesting patterns. First, it is evident that as the sample size increases, so does the number of taxa for most samples. This is to be expected, since these two variables are usually closely related (e.g., Lyman, 2008). This is illustrated by the fact that most samples fall close to the trend line (see Fig. 1). Second, at least two samples are anomalies. These are Thulamela, which has a relatively high diversity of taxa compared to the sample size, and Schroda, which has a relatively low diversity of species relative to the sample size. The two anomalies may not necessarily reflect garden hunting, however. For example, fragmentation, preservation, retrieval methods and analytical limitations could also have at least contributed to the observed patterns. Nevertheless, it is notable that both sites represent large, regionally significant settlements, and it may be that in their locally discrete ways, these centres were managing the relative exploitation of wild/domesticates for success.

The second approach uses the ratio of small to large game remains in faunal samples (Fig. 2). Based on concepts from human behavioural ecology, it may be expected that as large game decline around villages, more time and effort is spent hunting in fields, especially small game (*cf.* Driver, 2002). For example, the Game Index (GI) for Bosutswe in Botswana (Badenhorst, 2015) suggests the decline of large, highly-ranked prey in favour of intense hunting, and greater reliance on small, fast-reproducing game animals like hares and wild birds. A number of interesting patterns are revealed by the Game Index analysis of these sites. First, there are sites with large sample sizes, but which have a low Game Index. These include Diamant (EIA), Mwenezi (EIA) and Tshitsheme (LIA), all of which have GI values of 0. This may suggest that people had sufficient supplies of large game meat (for example, through non-garden hunting in the EIA or tribute accrual in the LIA). Second, there are sites with large sample sizes with the Game Index near-

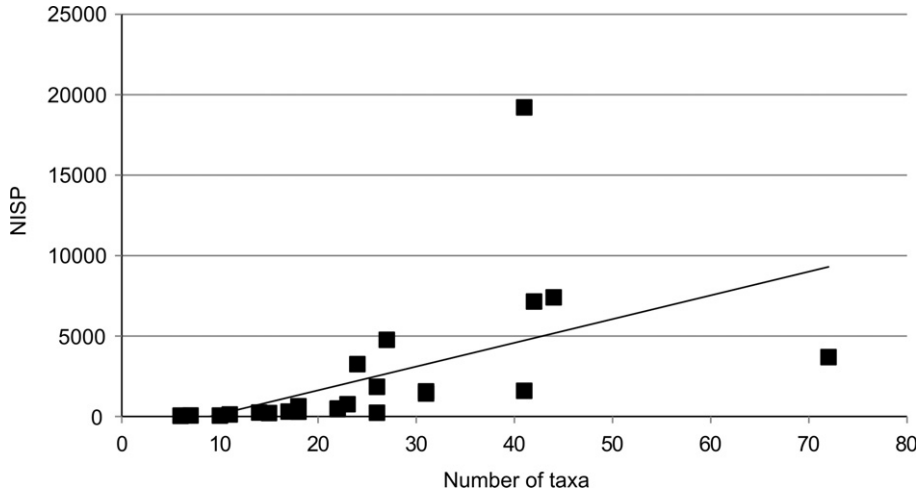

Fig. 1
NISP and number of taxa (trend line indicated).

ing or exceeding 0.5 (more than 0.5 indicating the presence of more low-ranked game than high-ranked ones), including Schroda (0.50), Pont Drift (0.52) and K2 (0.43), all of which may be evidence of garden hunting. Explanations for these selective hunting strategies are varied. All three sites date to the EIA-MIA and MIA and are comparatively substantial settlements during a period when population in the Limpopo Valley was increasing. As such, high-ranked game may have been increasingly rare in the vicinity. Evidence from all three also suggests participation in inter-regional trading networks, which probably focused larger game hunting practices on trade items such as ivory, and required hunters to travel long distances from home. More cultural explanations may also be relevant; game are often used for non-subsistence purposes, with Morton and Hitchcock (2014: 423) identifying the use of hare and porcupine in the making of personal ornaments by the Tswana. All three sites represent increasingly socially complex communities, within which we have evidence of varied craft specializations and diverse material cultures; the presence of organically sourced material objects should come as no surprise. A culinary preference for game meat may have also been a factor.

There is no progression in the Game Index over time (Table 1). This may be due to a number of

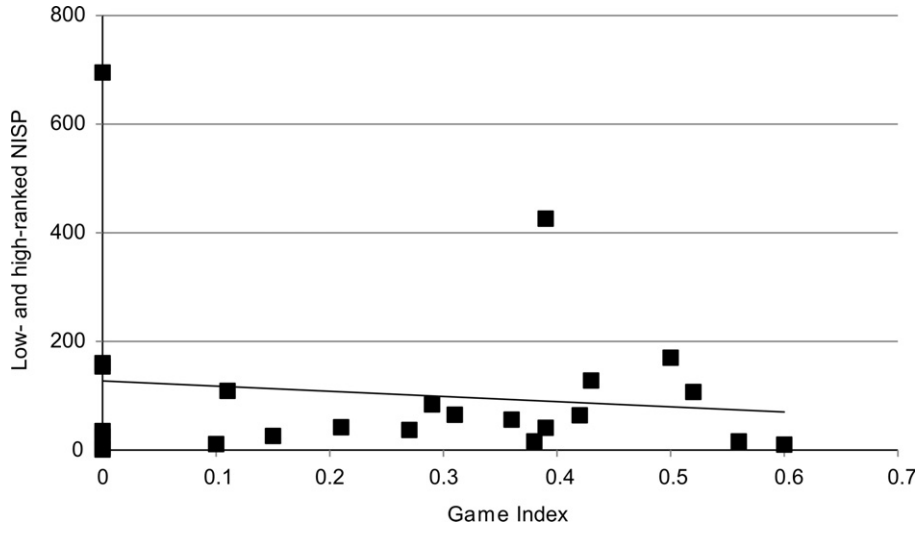

Fig. 2
Game Index values for sites in the Limpopo Valley and surroundings (trend line indicated).

reasons, including the imprecise dating and association of samples, such as Tavhatshena, which has an early occupation, but most of the fauna actually dates to the later part of the occupation (De Wet-Bronner, 1994). The sites in question are not consistently close enough to one another (either spatially or temporally) to argue for the effects of regional over-hunting, and it is conceivable that game numbers could have re-established themselves in an area after only a few years. We cannot therefore argue that there is a large-scale diachronic pattern of hunting change, and rather suggest that local dynamics and factors should be considered in future studies.

DISCUSSION AND CONCLUSION

Damage to crops by pests and other animals must have been considerable during the Iron Age. This has been a topic of contemporary research interest in Africa and most other parts of the world for several decades now (e.g., Ntiamoa-Baidu, 1997; Oerke, 2006). By the time ethnographies were undertaken of African farmers in southern Africa, the introduction of guns and horses had led to the rapid decline of large game animals, as well as other garden pests. Nevertheless, these ethnographies still provide compelling insight into potential patterns of garden hunting in the more recent past.

There can, then, be no doubt that Iron Age farmers hunted animals and pests in their fields. In addition, they probably spent considerable amounts of time in their fields chasing away pests such as birds, baboons, rodents, antelopes and even larger game such as elephants and hippopotami. As such, it is conceivable that at least some of these animals that were killed as part of daily life in villages ended up in the archaeological record. For example, it is often thought that animals such as baboons found in archaeological samples were killed for their body parts and not as a source of meat (Plug and Badenhorst, 2001). While there is certainly evidence from ethnographic sources that remains of baboons were used in divining kits (Plug, 1987), it is possible that at least some of these animals could also have been killed as pests in gardens. However, it must also be remembered that not all pests found in fields were hunted and consumed. For example, birds that could cause damage to crops may just have been chased away, or indeed, if they were killed, consumed in the fields by women and children. Such remains would not necessarily end up in the village middens we analyse as archaeologists.

The range of animals attracted to gardens is thus potentially wide, and includes small, medium and large game. It is therefore problematic to try and definitively link any one category of animal exclusively to the effects of garden hunting. Novel approaches may be useful for the future. For example, isotope studies of turkeys in the American Southwest indicate that they were dependent on maize for food, thus directly competing with humans (Rawlings and Driver, 2010) and providing circumstantial evidence for garden hunting. The high number of turkey suggests a need for these horticultural farmers to supplement their diet at considerable labour cost. This indicates localized hunting patterns, which could have included garden hunting (*cf.* Driver, 2011). Another possible avenue of research may be to focus on individual household middens in stone-walled settlements. It is conceivable that animal remains from such contexts reflect animals consumed by a particular household, and these could include pests hunted in gardens. We feel that the evidence presented here, whilst not unequivocal, is an initial contribution to this area of research. Whilst our focus here has been on large-scale modelling and analysis, our failure to find a long-term trend in hunting patterns suggests the need to focus on local factors. Various anomalous samples have been recognized in this study, and it is hoped that raised awareness of the potential role of garden hunting may assist future discussion of these intriguing finds.

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