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Feral Wild Boar

Species review

Mark Malins looks at the impact and implications of the increasing population of wild boar at loose in the countryside.

Wild boar (*Sus scrofa*) are regarded as an indigenous species in the United Kingdom with their place in the native guild defined as having been present at the end of the last Ice Age. Pigs as a species group have a long history of association with man, both as wild hunted quarry but also much as domesticated animals with links traced back to migrating Mesolithic hunter-gatherer tribes in Germany 6,000-8,000 B.P. (Krause-Kyora et al., 2012). In more recent medieval history the wild boar was classified as a beast of the chase (Rackham, 1995; Almond, 2003) and although of lesser importance than deer, it could be a contributor to royal forest income both as hunted quarry, but principally as a source of meat.

Forestry historian Cyril Hart (1971) describes a population kept in the Forest of Dean in the 13th century for the purposes of supplying the royal court with carcasses, requisitioned through the constable and culled by hunt staff. Reported culls during the reign of Henry I decline over time : 80 in 1260; 60 in 1267; dropping to single figures in the later years, but were then absent from forest records by 1550 (Hart, 1995). The royal forest of Pickering in North Yorkshire was according to Cox (1905) known for its wild boars and wild pigs, with records of requests from the royal court for carcasses in 1214 and 1227.

Chevenix-Trench (1967) reported that because of hunting pressure boar had become scarce in England in general by the early 15th century. Sir Richard Grobham of Great Wishford is credited with being the last man to slay a wild boar 'with his sword alone' – in Grovely Woods, Wiltshire, "which was the terror of the whole neighbourhood" (Oliver, 1951). Edlin (1952) reported that wild boar were still found in Staffordshire as late as 1683. Elsewhere re-introductions did take place with the naturalist Gilbert White (1789) noting the release of German wild boar in Alice Holt and Woolmer

Forests in Surrey, but meeting with local opposition, were soon destroyed.

Key factors in the demise of wild boar were considered to be physical removal through hunting and direct competition from domestic stock, such as in the Dean where right of



A large eviscerated feral boar in a game larder.

Features

pannage for domesticated pigs was of great importance (Hart, 1971); an expansion of the human population (Smith, 1978); disafforestation or spoiling of many royal forest hunting grounds (Thomas, 1983) and general loss of woodland (Rackham, 1996). When coupled with the later rapid development in agricultural technology and enclosure (Thirsk, 1990) there was little space in the countryside for such 'beasts of the chase'. Subsequent developments in woodland and forestry practice and importantly the classification of habitats has been without the presence of wild boar.

The modern interest in wild boar in the United Kingdom developed through the farming of imported animals kept within secure holdings and classified under the Dangerous Animals Act 1976. In the mid 1990s there were circa 40 holdings voluntarily registered with the British Wild Boar Association, but may only have accounted for 80% of all farms (Wilson, 2005). Although fencing was used to retain animals there were several escapes attributed to storm damaged trees breaching boundary fences, as well as some allegedly deliberate releases that have been attributed to animal rights activists; in some cases deliberate dumping has been suggested. (Forestry Commission England, undated).

Releases and escapes resulted in the establishment of several feral breeding populations in England, initially in the counties of Kent, Sussex and Dorset (Wilson, 2003). Farmed animals were dumped in the Forest of Dean with 14 near Ross-on-Wye in the early 1990s and a further 60 head at Staunton in 2004. Through the British Wild Boar website – an early example of citizen science – set up by Dr Martin Goulding, there have been additional reports of sporadic sightings in other areas, ranging from Cornwall to



Sow with striped young. (Photo: ©David Slater)

Northumberland, as well as reports of wild boar near to the M4 motorway in the area of West Swindon in 2005 and 2007.

Policy and legislation

Although considered a native, the wild boar is officially described as 'not normally present' (Wildlife & Countryside Act, 1981; Infrastructure Act, 2015). With the progressive expansion of the English wild boar population from a few early escapees to (then) possibly hundreds in local populations (Battersby, 2005), Defra the UK government department responsible for policy management decided in the absence of current official population data (Wilson, 2008; personal communication) that responsibility for wild boar should lie with local communities and individual landowners, without making any specific recommendations for control or animal welfare (Defra, 2008). By way of contrast the Welsh Assembly Government has a 'zero-tolerance' policy for any boar crossing the Wye. People who have allegedly been involved in releasing farmed boar into the Welsh countryside have been prosecuted.

Feral wild boar are not without some protection, featuring in The Wildlife and Countryside Act 1981 and The Wild Mammals (Protection) Act 1996; they do not have specific legislation affording a close season, but then neither does the invasive non-native, but well-established muntjac deer.

Species biology

Outside of the UK wild boar are widely distributed and form part of the globally invasive collection of free-living pigs; the IUCN regard wild boar as a species of least concern. A powerfully built animal, the mature male typically weighs 130-150kg and can exceed 200kg. Females typically weigh up to 80kg making wild boar one of our largest free-living mammals.

The classic physical appearance is of a bristly-haired pig, although the further ingress of genes from escaped domestic animals can result in mixed coat colours in some individuals. However the allele for bristly-hair is dominant and domestic coat colour traits are soon lost from a population.

The natural fecundity of wild boar, aided by their original hybridisation with commercial stock (Frantz et al., 2010) mean that British wild boar are prolific breeders with typical litter sizes of 4-7 being reported, while contemporary French research gives a range of 1-14 (Gamelon, 2013); sexual maturity is weight dependent at c.40kg, typically (but not exclusively) within an age range of 12-15 months. The striped offspring are weaned between 12 and 20 weeks and can



Rooted bluebell stands in the Forest of Dean.

benefit from living in a communal group or 'sounder', with additional post-natal care from other females enhancing survival rates. Young males are expelled from the female-dominated sounder, and can form groups, while sexually active mature males may be solitary for much of the year and travel widely.

Breeding ability enables a population to grow rapidly in size, which in the case of the Dean population has raised concerns at the Verderers Court. There is still much speculation on numbers; estimates put the Dean population at around 1,000; some gamekeepers consider that numbers in the wider Wye Valley may be nearer 2,000.

The preferred habitat is deciduous woodland, especially when mixed with cultivated agricultural land, with crops such as maize being used as a summer habitat. As an omnivore the wild boar will, like its domesticated relative readily make use of a range of sources of animal protein when available, both vertebrate and invertebrate (Giménez-Anaya et al., 2008), but rooting provides much of the diet, supplemented by seasonally available mast or agricultural crops (Schley and Roper, 2003; Herrero et al., 2006).

As with domestic pigs, the boar lacks an efficient thermo-regulatory system, being prone to cold in winter and heat in summer when use is made of wallows to cool off; however continental wild boar are widely distributed from the Mediterranean to northern Europe and Russia, so adaptability is a key trait. Conservation of wild boar as a popular quarry species helps to support a widespread distribution on the continent, with numbers being encouraged by supplementary feeding. In some cases animals are conserved within fenced hunting parks.

Impacts of wild boar on biodiversity

The return of wild boar has had a mixed reception. Some conservationists are cautious (Mammal Society, 2008), others welcome them citing the value of the foraging habits of boar in turning over woodland soil and encouraging seed establishment and promoting woodland succession, while the bristle-haired coat of the boar is also considered to facilitate the distribution of wild seeds. Soil is the major component of the woodland ecosystem, providing a seedbed, nutrients and water, which in turn creates a primary source of plant-based nutrition that supports many vertebrates and invertebrates. Loosening of the soil layer may enhance the rate of decomposition of organic matter and nutrient recycling, but on steep slopes, erosion and nutrient loss may result.

With a popular focus on the re-wilding of the landscape, the environmental campaigner George Monbiot is delighted by the prospect of wild boar being established through much of England within twenty or thirty years (Monbiot, 2013). However, Monbiot's enthusiasm is not universal. The rooting behaviour of wild boar has raised concerns of possible damage to plant communities. As well as some plants being eaten, others are left with exposed roots that will

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Fenced natural regeneration in the New Forest.

subsequently dry out. Heavy rooting can lead to high levels of loss of ground flora and the risk of eradication of individual plant species. Drifts of English bluebells (*Hyacinthoides non-scripta*) are frequently uprooted by boar, with Goulding and Smith (1998) having concerns over impacts. Retired gamekeeper Derek Harman (2013) provides photographic evidence of heavily rooted coppice woodland in Sussex that produced a wild daffodil ground flora layer eighteen months later, but does acknowledge that unlike bluebell roots, the boar may avoid consuming daffodil corms; also that bluebell woods can take a number of years to recover and the rooting process may release seeds of other plants that will out-compete the bluebells.

Game shooting is an important rural recreational activity and a significant source of income for many woodland owners. Although there is much investment in game-bird rearing, good habitat management that supports wild broods



Site of former natural regeneration uprooted by wild boar, Royal Forest of the Ardennes. Note control area behind fence.



Birch regeneration in a fenced compartment in the Dean.

of pheasants (*Phasianus colchicus*) and other wildlife is encouraged by the Game & Wildlife Conservation Trust, but the presence of wild boar with their opportunistic feeding habits would have the potential to reduce numbers of hatched wild chicks. The red-legged partridge (*Alectoris rufa*), the less common grey partridge (*Perdix perdix*) and the woodcock (*Scolopax rusticola*) are also potential victims of boar (Nyenhuis, 1991; Leaper et al., 1999). Small mammal populations including the dormouse (*Muscardinus avellanarius*) are regarded as being at risk from direct predation (Schley and Roper, 2003), but also as a result of competition for food sources (Focardi et al., 2000).

Impacts on Forestry

Within a forestry context some consider that the rooting activity of wild boar supports seed establishment and the recruitment of natural regeneration and Monbiot cites the benefits for both pine and birch seedlings. The theory of improved establishment of pine is supported with work done by Kepka (1989) in Brownlow (1994) where the removal of competing vegetation improved regeneration and subsequent growth rates, although we should also consider

that forester John McHardy could achieve extremely high rates of natural conifer regeneration at Longleat without wild boar being a free-ranging element of the Thynn menagerie. Elsewhere such as in the New Forest, fenced areas that exclude ungulates are capable of impressive levels of natural regeneration, while in the Forest of Dean birch is a naturally and freely establishing pioneer occurring within areas fenced to exclude deer and wild boar.

Oak and beech mast can form a major food source that attracts the boar into forest areas to forage, thereby removing potential seed and seasonal food from the ecosystem. Where rooting creates a seedbed that results in establishment of natural regeneration, boar will return and uproot the seedlings to eat the roots at a later date (Gómez et al., 2003; Licoppe, 2013; Harmer, 2015); this is illustrated on a site in the Royal Forest of the Ardennes (see far left).

Stems of mature trees can form rubbing posts where boar will remove mud from their coats and the bark from the tree, as will domestic animals kept at long-term high densities; bark can also be eaten at times of food shortage. Sexually active males will territory mark trees with their tusks, but levels of damage might be no more than deer and any significant damage is probably density-related.

Impacts on Agriculture

In Britain reported economic damage to crops appears to be mainly limited to pasture land adjacent to woodland, with grass being turned over and soil exposed. The level of damage appears to be proportional to population densities, but can be locally significant; a web search for wild boar damage will reveal many examples: the lesser damage shown in the photo above taken in North Devon reflects a small and localised population. The omnivorous nature of wild boar is reflected in more recent reports of predation on



Rooted pasture in North Devon.

lambs in Kent, Sussex and the Dean, that mirrors the Australian experience of feral pigs.

In continental Europe, the United States and Australia much more significant economic impacts in the form of crop and livestock damage have been reported (Kamler et al., 2008; (USDA, undated); Bengsen et al., 2014). Maize is particularly at risk, from the consumption of freshly drilled seed to extensively flattened areas in maturing crops; the growing reliance on forage maize as winter-feed for UK farm livestock can only further facilitate the spread of wild boar in the countryside. Oil seed rape and legumes are also reported as at risk (Schley et al., 2008; Keuling et al., 2008), plus potatoes, cereals, sugar beet and beetroot.

The United Kingdom has significant outdoor pig enterprises with consequent risks of the transmission of diseases such as brucellosis and classical swine fever to

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domestic stock, with possibilities for Aujeszky's disease and trichinella, as well as wild boar being a mobile reservoir for foot and mouth disease and tuberculosis. There are also the risks of crossbreeding with domestic sows as a result of entry into farm enclosures by feral males. When a feral wild boar broke into a pig enclosure and killed a domestic boar on HRH Princess Anne's Gatcome Estate in 2015, it made headline news.

Human dimensions

The social impacts of the return of wild boar to the Forest of Dean have formed a greater proportion of boar-related media coverage, principally because the Dean is very much a forest community, but also because of the development of wild boar interest groups. Noted impacts by wild boar include uprooted garden lawns, devastation of local football and cricket pitches, invading a school and turning over refuse containers. Their presence has been accepted by Forest Enterprise; perhaps a pragmatic approach, but supports Biodiversity 2020 outcomes (Defra, 2011), also the escalation of numbers and distribution across the Dean and Wye Valley probably makes removal virtually impossible with existing resources. *QJF* readers with Internet access can view a large collection of pictures and press copy featuring the impact of wild boar within communities in the Dean.

Road Traffic Accidents involving wild boar have been a common, long-term and expensive feature of life in continental Europe, reflecting their wider distribution and higher population densities (Groot Bruinderink and Hazebroek, 1996; Lagos et al., 2012). In Britain, Jochen Langbein (Langbein Wildlife Associates) collates data from the Deer Aware website that allows the recording and subsequent analysis of vehicle collisions involving deer, but has more recently recorded reports of collisions involving boar. He kindly supplied the author with England and Wales data for this article. (Figure 1).

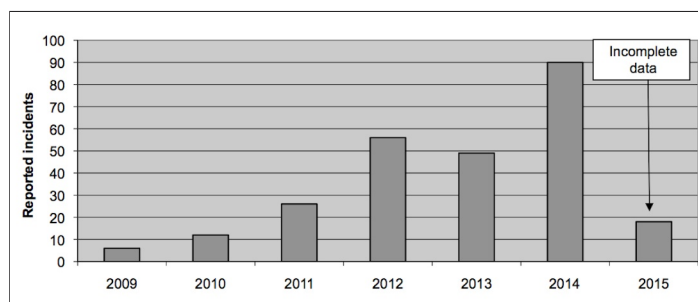


Figure 1. Annual Boar Vehicle Collisions.
(Data source: Jochen Langbein).

Hunting and conservation

While the demise of wild boar in 13th century Britain effectively removed the species from the 'hunting list', its popularity as a quarry species has never dimmed in continental Europe. Contemporary reports of the excitement of shooting driven boar in mainland Europe are regular features in the popular sporting press and hunting destinations for UK-based sportsmen are diverse (Valentine, 2008; Downing, 2013 & 2015). A pilot study by the author found that boar-hunting visits by British sportsmen were made to sixteen European states, plus four other countries in the wider world, with participants spending up to €8,750 a year (Malins, 2009). Closer to home opportunities to shoot feral wild boar on the periphery of the Forest of Dean have been advertised, as well as in Sussex as featured on the popular 'Guns-on-pegs' website. Wild boar remain 'feral' so they can be shot at any time of year subject to the wishes of the landowner and the permissions on individual firearm certificates.

A call from the hunting community is for female wild boar to be afforded a close season of up to nine months from January to September (Jackson, 2006) and be given the status of a game animal (Sweeting, 2013). It is a natural response; hunting is closely linked to maintenance of numbers to ensure a sustainable stock of animals to shoot. In the case of wild boar, the ability of sows to breed over a wide calendar would in practice restrict our ability to control numbers, especially in areas such as the Dean where the local population is large. With only a three-month window of opportunity for culling in autumn-winter with shortening day length, professional wildlife management would be compromised. Slater (2015) presents the interesting theory that in the Dean annual population growth is actually balanced by losses through shooting of animals that move out of the core forest area and by boar-vehicle collisions (BVCs); this highlights the need to share detailed cull data across the Wye valley and surrounding area. Whatever the actual figures in a localised area, there is value in looking at how numbers can escalate and then provide sufficient animals to enable a wider geographical distribution.

The author's model is based on a starting population in Year 1 of 30 yearling males and 30 yearling females, run over a 10-year period. Litter size from Year 1 is 5 and the litter sex ratio 50:50. Annual mortality is set at 35% for adults and 70% for animals in the first year of life; 90% of mature females breed every year, with a breeding life to six years of age (range 5-6; Goulding: British Wild Boar website); natural

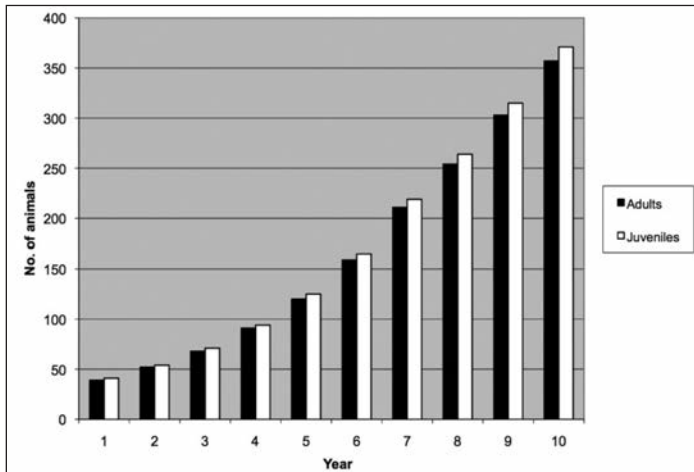


Figure 2. Modelled population growth for wild boar.

mortality (excluding hunting and vehicle collisions) for both sexes has been set at seven years of age.

Figure 2 illustrates the population growth over the 10 years, reaching 357 adults, plus 371 juveniles, totalling 728 head, with an average annual population increase of 28%.

In practice populations will grow to meet local resource limits, beyond which geographical expansion becomes a significant feature, highlighting the need to manage animals in a landscape context.

Detailed modelling of population scenarios is outside the scope of this article, but reductions in birth rate or female mortality do have significant impacts on population projections, highlighting that shooting male animals (a popular habit of hunters) has a negligible impact on population management. In order to reduce numbers or to maintain a lower 'sustainable' population, female animals have to be culled, or have their fertility controlled; a halt in the culling breeding females can result in a rapid escalation of numbers (Nahlik et al., 2009).

Discussion

The popular case for the restoration of wild boar is based on its place in the post-Ice Age list of fauna and that restoration ecology has the potential to enrich biodiversity. Prior to the passing of the Deer Act our largest mammals were regarded by many as vermin, so parallels can be drawn with the current position of wild boar. Today our native deer, when at an acceptable density, are regarded as important components of woodland ecosystems; at low population densities it is possible that in some circumstances wild boar could have a positive effect on the ecology of some of our woodlands. The problems arise in terms of the rapid escalation of numbers and their potential to increase their geographical spread into a mosaic landscape featuring agriculture, woodlands, wetlands and human populations in which wild boar as large, intelligent and omnivorous, opportunistic mammals can have undesirable impacts.

Our mixed success in regulating deer numbers is a clear pointer to concerns about our ability to control wild boar in 'managed populations' especially where policies to expand woodland cover will increase opportunities for wider distribution of boar in rural and peri-urban landscapes, with the combination of woods and agricultural crops allowing for a significant expansion of suitable habitat (Morelle and Lejeune, 2015). Wider distribution would also increase the likelihood of vehicle collisions with wild boar, if Monbiot's vision became reality.

The retention of restoration populations does offer opportunities to develop approaches to 'living with the boar' if they were to stay within specific landownership boundaries, but where do we draw the line for responsibility and accountability if we harbour a population that causes economic loss to others? The issue of rights and

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responsibilities in relation to wild deer has been previously highlighted (Watson, 2011) and calls for changes to legislation possibly influenced the content of the Infrastructure Act (2015), allowing government to issue control orders for species including wild boar to minimise impacts on biodiversity, other environmental interests, or the social and economic well-being of society.

The current England policy for wild boar may have the potential to work in local communities where there is a stakeholder consensus, with the proviso that both numbers and the geographical expansion are contained, but even a 'contained population' is not immune to the practice of capture and release of animals by those who wish to accelerate illegal geographical expansion. The author has been informed of the alleged capture of wild boar in the Dean for release on a sporting estate elsewhere in the Welsh Borders, reflecting practice in the US (Bodenchuk et al., 2010) and Australia (McGaw and Mitchell, undated). The appearance of muntjac deer in Ireland is a parallel example.

Woodland management is the core interest for many *QJF* readers for whom widespread free-ranging wild boar could compromise both occupier's liability and our ability to manage and restore protected sites. They would also limit our capacity to utilise high health status domestic pigs in restoration projects for neglected woodlands, a practice that has the double benefits of improving the landscape and providing a source of free range and traceable pork that may be a representative example of 'woodland heritage' within the context of 'living landscapes'.

Conclusion

Wild boar have been released into a landscape that developed and matured in their absence; as for their specific impacts on forestry a number of benefits have been cited, but Harmer et al., (2011) wisely consider that 25 or more years of the presence of boar in British woodlands is insufficient time within the life of a wood to firmly assess any benefits of free-living animals. Therefore in order to further develop evidence-based policy we need to consider an on-going programme of ecological, economic and social assessment of the impacts of wild boar. Any programme should follow the Biodiversity 2020 objective of sharing data – in this case detailed population and cull data – between scientists, hunters and interest groups. Research needs to be supplemented by effective population control at a landscape scale to limit the geographical spread of boar, because however keen our desire to measure and assess there is a need to balance

enthusiasm for ecological restoration with the practicalities of managing wildlife impacts in human-dominated landscapes.

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