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Wild Pigs
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Biology of Wild Pigs:



Wild Pig Food Habits

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Introduction

Wild pigs (*Sus scrofa*) are omnivorous and generally opportunistic in their food habits (Sweeney et al. 2003). The ability of this species to survive on almost anything edible is one of the primary factors that led to the globally common use of free-ranging husbandry practices with the domestic component of *S. scrofa*. It is also one of the main reasons why this species has been so successful as an invasive species in establishing new wild-living populations in non-native areas. In spite of being omnivorous, studies have shown that the year-round diet of wild pigs contains a predominance of plant material (Table 1). However, algae, fungi and animals, as well as other materials, are also included in the list of items eaten by this suid. The specific composition of the diet of any one wild pig population is largely dependent upon what foods are available in the local area at any point in time. The season or time of year typically determines the bulk of their diet. In addition, these animals tend to maximize the intake of a preferred food resource when it is encountered. This adaptability can occasionally result in abrupt and radical seasonal changes in diet being observed as new forage species become available (Barrett 1978).

In addition to contributing to the species' capabilities as an environmental generalist, the diverse spectrum of potential forage resources used by wild pigs also increases their potential to impact natural and manmade environments. In any one area, wild pigs have been reported to feed on hundreds of different kinds of organisms (e.g., Genov 1981a, Thomson and Challies 1988, Schley and Roper 2003; Table 2). Understanding the species that wild pigs might forage on could be useful in trying to control or reduce potential impacts. Such knowledge is also required to understand the ecological influences of the feeding behavior of these animals in both native and introduced areas, as well as their role within the local food chain (Chimera et al. 1995, Baubet et al. 2004).

The purpose of this paper is to provide a general overview of wild pig food habits. Several topical areas were focused on and addressed in this review, including plant consumption, algae consumption, fungi consumption, animal consumption, other material ingestion, seasonal dietary variation, nutritional aspects of the diet, and the effect of diet on productivity. In addition to that obtained from the scientific and popular literature, data or information on wild pig food habits from the Savannah River Site (SRS) in Aiken, Barnwell and Allendale counties, South Carolina, has also been included.

Results/Discussion

The wild pig's alimentary tract is identical to that of its domestic counterpart. The stomach is a simple, non-ruminating structure. It is technically two-chambered with a small blind pouch or diverticulum, having a total capacity in adults of approximately 5 to 8 liters (Briedermann 1986). Typically, these animals can daily eat between 3 and 5 % of their total body mass (Bodenchuk 2008). Pinna et al. (2007) reported that the mean pH of wild pig stomach contents was 3.8. The colon is spirally coiled with a caecum at the anterior end of the large intestine. The wild pig digestive tract is capable of adequately digesting and utilizing plant, algal, fungal and animal matter. However, it has a poor capacity for breaking down cellulose and hemicellulose, structural carbohydrates that form the nutritional basis for ruminants (e.g., bovinds, cervinds, etc.). Suids cannot effectively digest these structural carbohydrates relative to ruminants

because: (1) they do not possess the bacteria/protozoan-filled 4-chambered stomach system of the ruminant that digests forage through fermentation, and (2) their digestive strategy is to maximize forage intake and gut transit time. Rather, wild pigs possess a stomach that relies on gastric secretions and enzymes for digestion, and the point where fermentation can take place (i.e., caecum and colon) is located behind the primary structure responsible for nutrient absorption (i.e., small intestine). Additionally, fermentation is a relatively slow digestive process, and the rapid passage rate of digesta does not allow for efficient fermentation. As a result, wild pigs tend to select forages that are easily digestible and low in structural carbohydrates.

The reported dietary variation between the sexes or age classes in wild pigs has not been consistent among populations. In general, most studies (e.g., Wood and Roark 1980, Scott and Pelton 1975, Durio et al. 1995, Loggins et al. 2002, Adkins and Harveson. 2006, Skewes et al. 2007) have found no difference in the diet with respect to either sex or age. Similarly, Barrett (1978) found no apparent variation in food habits between the sexes or age classes with one exception. He observed that adult boars tended to eat more carrion than other hogs due to their ability to dominate a carcass. Adult boars also tend to be more mobile than either sows or younger males. This would probably further increase their chances of encountering and utilizing carrion as a food resource. In contrast to these other studies, Dardaillon (1989), Abaigar (1993) and Groot Bruiderink et al. (1994) all reported that a greater proportion of animal material was found in the stomachs of young wild pigs compared to adults. Dardaillon (1989) also found a greater overall diversity of foods in the stomachs of younger individuals. The latter broad dietary diversity was suggested as an advantage for young and inexperienced individuals still learning to cope with fluctuations in food availability in the local area.

Thomson and Challies (1988) characterized three general types of foraging used by wild pigs: (1) browsing and grazing – leaves, fronds, stems, etc.; (2) foraging on the ground – fruits of woody species, fungi, small animals, vertebrate carrion, etc.; and (3) rooting – rhizomes, tubers, bulbs, corms, invertebrate larvae, small fossorial vertebrates, etc. Wild pigs normally rely upon their keen sense of smell to identify potential food items. Most forage resources that they consume will be at or near ground level (Table 3). Additionally, wild pigs are extremely adept at locating and obtaining potential forages below the soil surface by rooting, and much of their diet is obtained in this manner. With the use of their snout and strong neck muscles, they are able to overturn large amounts of soil material. Depending upon forage type, as well as soil density, moisture level, and compaction, they may obtain forages from a few centimeters up to a meter or more below the soil surface. This difference between above and below ground foraging varies by season and location with respect to resources that are available (Table 3).

Plant Consumption - Floral material makes up the majority (approx. 88%) of a wild pig's dietary composition and is consumed year-round. This plant forage composition can vary from 57 to 99% of an animal's diet (Table 1), and seasonally can be as great as 100% (Klaa 1992). The list of plant species consumed by wild pigs is considerable (Table 2), and the main plant food categories include fruits, seeds, leaves, stems, shoots, bulbs, tubers, and roots. The makeup of these basic types of plant foods varies by location (Table 3). The general plant taxa consumed by these animals collectively includes Bryophytes (i.e., mosses), Pteridophytes (i.e., ferns and horsetails), Pinophytes (i.e., conifers) and Magnoliophytes (i.e., flowering plants).

Native plants represent the majority of the wild pig diet. However, pigs will be highly selective of which plant species they consume, the time of year that particular species are consumed, and what plant parts are consumed. Plant phenology influences forage selection, varying from seeds or newly emerged sprouts to plants that have entered senescence (Howe et al. 1981). Plant species/part selectivity will be a function of digestibility and availability. Normally, preferred plant parts are fruits, seeds, bulbs, tubers, and roots (see Tables 2 and 3) as these structures are normally low in structural carbohydrates and are easily digested. The high composition of simple sugars, starches, and lipids, and relatively low concentrations of plant defensive compounds that may inhibit digestion cause them to be highly desirable.

Of the various species of plants consumed, mast (e.g., acorns, beechnuts, chestnuts, and hickory nuts) appears to be most important and preferred (Barrett 1978, Henry and Conley 1972, Sweeney et al. 2003). The same is true for populations in their native range (e.g., Sjarjadi et al. 1992, Fournier-Chambrillon et al.

Wild Pigs

1995, Durio et al. 1995, Groot Bruinderink and Hazebroek. 1995, Schley and Roper 2003, Irizar et al. 2004). This is evidenced by both the preponderant usage of this food when available and the effect that abundance of this resource has on reproductive success within a population (Matschke 1964, Schley and Roper 2003). In fact, wild pigs will consume acorns for as long as this forage resource is available (Fournier-Chambrillon et al. 1995). This preference holds true more than for any other forage resource used by these animals (Henry and Conley 1972). Its use can reach 90% in volume and 100% in occurrence in the wild pig's seasonal diet (Henry and Conley 1972, Ackerman et al. 1978, Irizar et al. 2004). Hard and soft mast crops represent forages that are very high in energy, and when available can often be found in large quantities. While mast is a pulse resource and somewhat unpredictable from year to year, normally there is some form of mast available during late summer through mid-winter of each year in most areas. Although typically obtained through shallow rooting in the leaf litter, wild pigs will also obtain hard and soft mast by exploiting subsurface hoards collected by mammals (e.g., squirrels and small rodents) when encountered (Focardi et al. 2000). The consumption of these caches by wild pigs throughout winter may negatively affect productivity of local populations of these species of small mammals.

Subsurface herbaceous materials (e.g., roots, tubers, bulbs, etc.) are widespread and important staples in wild pig diets throughout their distribution. In general, wild pigs tend to prefer fleshy roots or corms to woody roots (Howe et al. 1981). Subsurface foraging by wild pigs increases with altitude, with roots constituting 71% of the diet in areas of the French Alps above 1,900 m (Baubet et al. 2004). At higher elevations, where mainly pastures or open meadows occur, roots are an even more important part of the diet. More specifically, rooting for subsurface herbaceous materials is the only way to readily access foods in these higher elevations during winter months (Baubet et al. 2004). Roots also become important during fall and winter when mast crops fail (Scott and Pelton 1975, Wood and Roark 1980, Baber and Coblenz 1987). In contrast to the widespread use of this general forage resource, Irizar et al. (2004) found no evidence of any belowground herbaceous material in the fall and winter diets of wild pigs in northern Spain.

Because of their relatively high digestibility and their high concentration of individual plants, agricultural crops are a highly preferred food source for wild pigs when available. Consumption of agricultural crops encompasses a variety of forage resources including grains/cereals (e.g., wheat, sorghum, barley, hay, rye, oats, millet, maize/corn, and rice), vegetables (e.g., various potatoes, yams, squash, turnips, rutabagas, beets, cassava, lettuce, cabbage, beans, peas, soybeans, and artichokes), fruits (e.g., pumpkins, grapes, blueberries, pineapples, avocados, bananas, apples, various citrus species, watermelons, cantaloupes, and coconuts), and other crops (e.g., cotton, linseed, sunflower, peanuts, almonds, oilseed/rapeseed, groundnuts, pecans, clover, thyme, basil, oil palms, sugar cane, rubber seeds, padi, and turf/sod/pasturage) (Diong 1973, Tisdell 1982, Brooks et al. 1988, Stevens 1996, Devine 1999, Schley and Roper 2003, Mapston 2004, J. J. Mayer, unpubl. data). The use of agricultural crops as a forage resource by wild pigs varies, ranging from nothing up to 71% of the plant material consumed (Genov 1981a, Irizar et al. 2004). In most locations where these foods are available, the use of agricultural crops typically ranges from about 30-50% of the plant volume eaten (Fournier-Chambrillon et al. 1995, Herrero et al. 2004, Giménez-Anaya et al. 2008). In discussing this variation, Sjarjadi et al. (1992), Wlazelko and Labudzki (1992) and Fournier-Chambrillon et al. (1995) all suggested that when natural foods are in abundance, wild pigs will not use agricultural crops. Soybeans, peanuts, and other leguminous species are highly desirable because of their extremely high protein levels. When available, wild pigs will visit agricultural fields with high-protein species on a daily/nightly basis and can cause significant amounts of damage and crop loss. Genov (1981b) reported that 90% of damage by wild pigs to agricultural crops in Poland were to potato, rye and oat fields. In addition to those agricultural crops that are high in protein, wild pigs will readily consume corn, sorghum, wheat, rice, and other grain crops that are carbohydrate-based.

Wild pigs can have negative impacts on pine and hardwood timber production in some areas through direct foraging on those commercial species. Plantings of longleaf pine (*Pinus palustris*) seedlings have been documented to receive significant damage due to foraging by wild pigs (Lipscomb 1989). Wild pigs are attracted to the starchy bark of the root of longleaf seedlings, and an individual pig can destroy 200-1,000 planted longleaf seedlings in a single day (Wakeley 1954). Wood and Roark (1980) observed that wild pigs typically do not completely ingest the seedling roots, but rather chew the root, swallow the sap and starches, and then spit out the chewed woody tissues before moving on to the next seedling. Such foraging

can also include the roots of seedling slash pines (*P. elliotti*), loblolly pines (*P. taeda*), and pitch pines (*P. rigida*), although this is relatively uncommon. Wild pig damage has also been reported to hardwood/deciduous tree species. Similar to pines, wild pigs also dig up and consume the root stock of planted hardwood seedlings (Mayer et al. 2000). Wild boar have been found to selectively forage on the germinating seedlings and saplings of oak and beech species, having a special interest in the highly digestible and protein rich roots in late winter and spring (Groot Bruinderink and Hazebroek 1996).

Wildlife plantings or food plots (e.g., millet, winter wheat, clover, etc.) intended for native game species are normally very attractive to wild pigs and can receive significant damage due to foraging and rooting in the plots (Hanson and Karstad 1959, J. J. Mayer, unpubl. data). Wild pigs will also readily consume supplemental feed and bait (e.g., shelled corn) placed for native game species during fall and winter months (Fournier-Chambrillon et al. 1995, Taylor and Hellgren 1997). This type of opportunistic foraging would also include the use of bait lines set up at wild pig traps, which can often entail these animals not entering the associated traps and being caught. In some situations, the intense use of these resources can result in these food items comprising between 20-40% of the seasonal diet of these animals (Fournier-Chambrillon et al. 1995, Taylor and Hellgren 1997, Herrero et al. 2004, Adkins and Harveson 2006).

Algae Consumption – Where available (e.g., on oceanic islands and in coastal habitats), algae in the form of green and brown seaweeds found on exposed shores are opportunistically consumed by wild pigs. Challies (1975) and Chimera et al. (1995) reported that seaweed composition in the diet of wild pigs in coastal areas on Auckland Island, New Zealand, was 0.2% and 15%, respectively, by volume. Working at the same location, Rudge (1976) speculated that the presence of seaweed in wild pig diets was probably due to these animals eating the regurgitation of New Zealand sea lions (*Neophoca hookeri*) rather than the pigs foraging on the algae themselves. The frequency of occurrence in wild pig stomach was also low (i.e., 2-6%) (Rudge 1976, Chimera et al. 1995). In general, given the limited areas within the species range for such opportunistic foraging of seaweeds, algae would be a minor component of the overall wild pig diet.

Fungi Consumption – Wild pigs eat fungi (i.e., the fruiting bodies), but typically this is a small component of their diet (approx. 2%). The amount of fungi consumed depends upon availability of other forage resources. Fungi can be found in the diet year-round, and has variously been reported to be most frequent in winter (Genov 1981a), spring (Springer 1975, Baron 1979) and summer (Ackerman et al. 1978, Wood and Roark 1980). Skewes et al. (2007) found an overall greater proportion by volume (i.e., 15.9%) of fungi in the diet of wild pigs in Chile than had been reported elsewhere, while both Springer (1975) and Ackerman et al. (1978) found seasonal peaks of fungi consumption of 14.6% and 18.6%, respectively. Other studies (e.g., Springer 1975, Genard et al. 1988, Abaigar 1993, Fournier-Chambrillon et al. 1995, Skewes et al. 2007) have reported a fairly high frequency of occurrence of fungi remains (i.e., up to 69%) in wild pig stomachs. In contrast, a few studies did not report consumption of any fungi by these animals (e.g., Dardaillon 1987, Massei et al. 1996). Because of the high digestibility of fungi, Schley and Roper (2003) suggested that such differences could result from the presence of fungi only being found if eaten relatively recently by the wild pigs whose stomachs were being examined.

Animal Consumption - Like plants and fungi, animal material (i.e., invertebrates and vertebrates) is consumed year-round (Scott and Pelton 1975). The list of animals consumed by wild pigs includes earthworms, arachnids, crustaceans, insects, myriapods, gastropods, nematodes, fish, amphibians, reptiles, birds and mammals, and can include the egg, larval/immature and adult forms of various species (Table 2). Compared to plants, animal material typically makes up a smaller percentage of the dietary composition (approx. 10%). However, all 40 studies listed in Table 1 reported at least some animal matter composition in the wild pig diet. While the composition by volume in the diet can be low (e.g., 5-8%), the frequency of occurrence within the stomachs examined is often very high (e.g., 80-90%) (Rudge 1976, Diong 1982, Herrero et al. 2004, Irizar et al. 2004, Giménez-Anaya et al. 2008). It has been suggested that food habits studies of wild pigs may under represent the percentage of animal matter in the diet (Hahn et al. 1998, Loggins et al. 2002). Rapid digestion of soft tissues often causes animal matter to be overlooked when conducting an analysis of stomach contents or feces (Klaa 1992, Fournier-Chambrillon et al. 1995, Schley and Roper 2003). Unless exoskeleton, bones, scales, feathers, hair, or remains are present, documentation may not occur.

Wild Pigs

The presence of animal matter in a wild pig's diet has been reported to be due more to availability and accessibility rather than prey selection (Klaa 1992). However, Fournier-Chambrillon et al. (1995) stated that the presence of at least some animal foods in the wild pig's diet was indispensable. Ingestion of these high-protein foods may be important for growth and survival in wild pigs (Schley and Roper 2003). In fact, studies have shown that wild pigs intentionally deprived of animal proteins will lose weight over time (Klaa 1992). Wilcox and Van Vuren (2009) reported that wild pigs found with vertebrate prey in their stomachs were in poorer physical condition (i.e., based on rump fat thickness) than pigs whose stomachs did not contain vertebrate prey. These authors further suggested that protein deficiency may be an important factor influencing the predation of vertebrates by wild pigs, particularly for females facing the physiological cost of pregnancy.

Typically, more invertebrate than vertebrate remains are found in the stomachs of wild pigs (Henry and Conley 1972, Scott and Pelton 1975, Skewes et al. 2007; Table 4). Invertebrates were found in all 40 studies reviewed. Typically, either insects or annelids are the most common general types of invertebrates eaten by wild pigs, followed by myriapods, crustaceans, gastropods and other taxa (e.g., nematodes, arachnids, etc.) (Klaa 1992, Schley and Roper 2003). Invertebrates are consumed by wild pigs year-round (Springer 1975).

Within the invertebrate portion of the wild pig diet, insects usually comprise the majority of the volume reported. Frequency of occurrence has been reported to be as high as 100% (Ackerman et al. 1978). Although they can consume any life stage (e.g., larval, pupae, instars, adults), most of the remains found in wild pig stomachs and scats are larval forms. The spectrum of insect taxa consumed by wild pigs is more diverse than in any other invertebrate group consumed, encompassing at least 6 Orders and 24 Families (Table 2).

Because of their high protein content, earthworms are frequently reported to be found in wild pig diets (e.g., Giffin 1970, Challies 1975, Scott and Pelton 1975, Wood and Roark 1980, Howe et al. 1981, Fournier-Chambrillon et al. 1995, Massei et al. 1996, Baubet et al. 2004). In some extreme cases, annelids are the most important animal food eaten by wild pigs (Challies 1975, Diong 1982, Asahi 1995). The frequency of occurrence for earthworms has been reported to be as high as almost 90% in wild pig stomachs (Diong 1982). As many as 300 earthworms have been found in a single wild pig stomach (Hanson and Karstad 1959). Earthworms are consumed year-round, with some seasonal variation observed. Fournier-Chambrillon et al. (1995) noted that earthworm consumption by wild pigs was related to the amount of rainfall, reporting that volume was greatest in winter, but frequency of occurrence was greatest in the fall. They further reported that earthworms were absent in wild pig stomachs during the summer months. In contrast, Baubet et al. (2004) reported that earthworm use by wild pigs as a food resource in alpine areas was least in winter. These authors further explained that earthworms are less accessible during winter months because of snow cover and the deeper depths that these worms retreat to during the colder months in these habitats (Baubet et al. 2003, 2004).

Most (86%) of the 40 studies reviewed listed vertebrates as consumed by wild pigs. Typically, this consists of either whole small vertebrates or carrion of larger animals. The intentional predation of small vertebrates does occur (Loggins et al. 2002). Both male and female wild pigs use vertebrates as a forage resource, and they are consumed during every season (Springer 1975). This type of predation has been reported to be most frequent from the summer through the winter months (Breidermann 1976, Tucak 1996, Wilcox and Van Vuren 2009). Stomachs of wild pigs have been found with multiple individuals (e.g., 2 to 49) of small vertebrate prey (e.g., anurans, rodents) in them (Schneider 1975, Wilcox and Van Vuren 2009, Jolley et al. In Press). Many of the vertebrate prey examined appear to have been taken during active predation by the wild pigs (Wilcox and Van Vuren 2009). In fact, Loggins et al. (2002) reported that one wild pig was observed standing motionless for over 20 minutes above a ground squirrel burrow, apparently waiting for the opportunity to catch one of these rodents. Some of the vertebrate prey were fossorial or semi-fossorial, suggesting that these animals were taken opportunistically by pigs during rooting or grazing (Wilcox and Van Vuren 2009). There have been cases where pigs consumed more than just the prey species. For example, Giménez-Anaya et al. (2008) reported that one wild pig even had a common moorhen (*Gallinula chloropus*), that bird's nest and the nest of a purple gallinule (*Porphyrio porphyrio*) in

its stomach. Schley and Roper (2003) reported that amphibians and reptiles were generally not taken in large volumes.

Wild pigs can also be voracious predators of larger animals, preying on several species of domestic livestock and wild game. However, Wood and Barrett (1979) stated that both witnessed attacks and the actual killing of these larger species are rare. In spite of that fact, such predation does still occur. Hennig (1981) reported that wild pigs will directly kill and consume roe deer fawns (*Capreolus capreolus*). Pavlov and Hone (1982) described the predation of lambs by wild pigs. Beach (1993) reported that livestock losses to wild pigs in Texas included lambs, adult sheep, kid goats, adult goats, calves, and exotic game species. Several authors (e.g., Rutledge 1970, Springer 1975, Jolley 2007) have reported predation of white-tailed deer fawns by wild pigs. In addition, the surplus killing of sheep and goats by wild pigs in small fenced enclosures has been observed in Edward's Plateau, Texas (R. F. Smart, pers. comm.). Often such attacks are the result of a momentary opportunity. In a heretofore unreported type of predation, three feral hogs were observed to attack, kill and partially consume an adult Rio Grande wild turkey hen on a wildlife food plot on the King Ranch, Texas, where all four animals had been feeding together in close proximity only moments before the attack (T. C. Urban, pers. comm.).

Wild pigs will readily consume animal carrion (e.g., Giffin 1970, Rudge 1976, Barrett 1978, Everitt and Alaniz 1980, Thomson and Challies 1988, DeVault and Rhodes 2002). In fact, the presence of large vertebrate material in most studies has normally been assumed to have been taken as carrion (Schley and Roper 2003). Wilcox and van Vuren (2009) defined the basis for identifying vertebrate remains as carrion in a wild pig stomach as the presence of dehydrated tissue, the odor of decomposition, and tissue being infested with maggots. Although usually not a major component, vertebrate carrion can make up to 12.4% of the wild pig diet (Thomson and Challies 1988). Wild pigs have been reported to scavenge on vertebrate carrion varying in size from as small as rodents (DeVault and Rhodes 2002) up to carcasses as large as ungulates and pinnepeds (Rudge 1976, Thomson and Challies 1988). In fact, wild pigs have even been documented to opportunistically forage on human remains in post-combat situations and from accidental or medically-related fatalities occurring in rural areas (Williams et al. 1998, Rockenbach 2005). Fish found in wild pig diets are usually opportunistically consumed as carrion when encountered washed up dead on shores or in dried-up pools and drainage channels (Baron 1979, Schley and Roper 2003). Wild pigs will also occasionally feed on weathered skeletons of both wild pigs and other vertebrates as a calcium source (Rudge 1976, Diong 1982).

Much consumption of animal matter is likely opportunistic and a result of randomly discovering prey during foraging bouts. As a result, their impact on most species is likely negligible. However, some researchers have suggested that feral pigs may have negative consequences for local populations of some reptile and amphibian species. Jolley et al. (In Press) suggested that high rates of consumption of pulse-breeding, adult amphibians could have negative consequences for local populations. Consumption of eggs of ground-nesting reptiles is also reported to be a threat to some species (Coblentz and Baber 1987, Oliver and Brisbin 1993, Taylor and Hellgren 1997). While not well documented, consumption of eggs of ground-nesting birds could have negative impacts on some species as well.

Ingestion of Other Material – In addition to plants, algae, fungi and animals, wild pigs have been found to ingest other materials (e.g., miscellaneous biotic matter, garbage, soil). Rudge (1976) found that most of the wild pig stomachs examined on Auckland Island contained such materials. In some cases, these materials are incidentally ingested during either rooting or surface foraging. For example, reported biotic materials that were probably incidentally ingested included pieces/lumps of wood, peat and lichen (Henry and Conley 1972, Rudge 1976). In other instances, the consumption of these materials is intentional. In either case, these items tend to make up a very small portion of their diet by volume (<1%).

Wild pigs have been reported to feed on garbage or refuse in several locations (e.g., Hanson and Karstad 1959, Henry and Conley 1972, Scott and Pelton 1975, Ackerman et al. 1978, Erkinaro et al. 1982, Herrero et al. 2004, Giménez-Anaya et al. 2008). This has been documented to include both edible (e.g., discarded food waste) as well as inedible (e.g., plastic, rubber bands) refuse. Henry and Conley (1972) specifically noted that wild pigs foraged in local garbage pits in eastern Tennessee, with garbage composing up to 11.8% of the volume of the annual fall diet in these animals in that area. However, the authors did not

Wild Pigs

consider garbage to be an important source of food for these animals. Based on anecdotal observations, Hanson and Karstad (1959) reported that garbage was superior to shelled corn as trap bait. More recent studies (e.g., Wathen et al. 1988) have shown the opposite to be true. The Three Rivers Solid Waste Authority regional landfill located on the SRS has recently reported large numbers of wild pigs rooting up and foraging in the facility's sanitary solid/household waste disposal cells. As many as 100 wild pigs at a time were observed foraging for garbage there at night during the spring and early summer of 2009 (J. J. Mayer, unpubl. data).

Incidental consumption of trace amounts of soil/sand and rocks/gravel by wild pigs as a result of rooting has been reported previously (e.g., Baker 1975, Scott and Pelton 1975, Rudge 1976, Ackerman et al. 1978, Klaa 1992, Durio et al. 1995). These geological materials have been reported to be present in trace amounts up to 5.3% of the annual diet by volume (Ackerman et al. 1978, Durio et al. 1995). On a monthly basis, this volume has been reported to be as high as 9.9% (Klaa 1992). Based on estimates made using acid-insoluble ash content of wild pig scats collected at the SRS, Beyer et al. (1994) estimated that 2.3% of the diet of these animals consisted of soil. Similar amounts (i.e., 3.3-8.0%) of soil ingestion have also been reported for domestic swine (Fries et al. 1982).

Seasonal Dietary Variation – Throughout their range, the diet of wild pigs varies by season. This variation is primarily a function of availability and abundance of local plant and animal communities (Klaa 1992, Sjarjadi et al. 1992). Globally, similar food types (e.g., plants, animal matter, roots, etc.) tend to be consumed during the same season, with local variation based on species composition. Preferences among food items do occur as evidenced by a few items making up most of the seasonal diets in these animals locally (Everitt and Alaniz 1980). In addition, the seasonal effect or change in the diet is not always consistent between years (Taylor and Hellgren 1997). In contrast to data from most studies, Loggins et al. (2002) reported that the diet of wild pigs in a central California coastal area was similar among all seasons, except for the fall, when acorns were the predominate food item.

Along with availability, phenology (often influenced by precipitation) and nutrition levels in different plant parts changes seasonally, and consumption by wild pigs changes accordingly. In general, there is extensive use of seasonally available fruits, regardless of location (Thomson and Challies 1988). However, roots were the most consistent food item consumed all year. Genov (1981a) further reported that the frequency of consumption of aboveground plant material was greatest in spring and least in winter, while the reverse occurred for subsurface plant material. Diong (1982) reported that, with the exception of two food items, seasonal variation was not apparent in the diet of wild pigs in the Kipahulu Valley. This was driven by seasonal availability of these two plant species (i.e., tree ferns, *Cibotium* sp., and strawberry guava, *Psidium cattleianum*). Baber and Coblenz (1987) reported that seeds, fruits and roots were used more during the dry season (June through December), while the use of grasses and forbs was greatest in the wet season (January through May) on Santa Catalina Island.

In comparing the different studies on food habits of wild pigs, the consumption of animal material varied greatly between seasons. The use of animal matter by wild pigs is a function of seasonal availability and whether particular species tend to be available as pulse resources, or consistently throughout the year. For example, Jolley et al. (In Press) reported that consumption of herpetofauna occurred in two major pulses (July–August and December–January), which was most likely driven by availability. Baber and Coblenz (1987) noted that insect consumption did not vary between seasons. The use of carrion can increase during fall and winter due to greater availability of carcasses and entrails generated by sporthunting activities.

Most studies (e.g., Pine and Gerdes 1973, Wood and Roark 1980) have reported that wild pig diets during winter months are dominated by either mast or roots. During years of mast failure, roots become the dominant forage resource (Scott and Pelton 1975), while mast predominates in the diet during years of high mast production. Giménez-Anaya et al. (2008) stated that agricultural crops were less available in the winter, so wild pigs turned to consuming more subsurface parts of non-agricultural plants. Fournier-Chambrillon et al. (1995) reported that animal matter is consumed during winter, but like the rest of the year, plant items are the most abundant forage resources in the diet. In contrast, Hanson and Karstad (1959) found that winter foods of wild pigs in the Coastal Plain of Georgia consisted of only plant material.

During spring, new growth of grasses and other vegetation becomes much more important as it is lower in structural carbohydrates at this time of year and more easily digestible. Scott and Pelton (1975) reported that grass made up 86.7% of the spring diet. Wood and Roark (1980) also found that herbage/foilage consumption was greatest in spring. Eriksson and Petrov (1995) found that rooting was low during the spring months, most likely because of high availability of protein-rich, above-ground plant parts. Hanson and Karstad (1959) reported that animal material increased in the spring as well.

In general, grasses and new vegetative growth remain important during summer (Pine and Gerdes 1973, Scott and Pelton 1975, Wood and Roark 1980). In addition, insect availability and soft mast production are generally greatest during summer, and the diet of wild pigs reflects this availability. Some roots are also used, especially during dry periods.

During fall, hard mast again becomes a major component of the diet (Pine and Gerdes 1973, Wood and Roark 1980). During years of mast failure, roots are again the prominent forage resource (Scott and Pelton 1975). At this time, there also tends to be very little vegetative growth, so plant material above the soil surface decreases in importance. Eriksson and Petrov (1995) found that rooting increased to a peak in the fall and remained important for acquiring food during the winter months.

Nutritional Aspects of Diet – Nutritional condition of wild pigs varies seasonally. In most cases, it can be expected to be poorest during winter because of poor availability of food resources. However, during years with exceptional hard mast production, pig populations can be found to be in exceptional condition during winter. In general, nutritional condition of wild pigs is greatest during spring, when there is a flush of new vegetative growth, and fall, when hard mast is available in large quantities. Nutritional condition can vary during summer, as this is the time of year when drought can significantly reduce food availability.

Depending upon the area, wild pigs will consume at least one energy-rich plant food (e.g., acorns, beechnuts, chestnuts, pine seeds, olives, cereal grains, or other crops) (Schley and Roper 2003). Nutrient levels vary considerably by forage type. Fruits contain high concentrations of readily digestible carbohydrates (sugars and starch) relative to green foliage. Some fruits are especially high in lipids that provide readily available energy. Foliage contains more protein than fruits, but the high concentration of structural carbohydrates (e.g., cellulose and hemicelluloses) reduces its digestibility. Some fruits contain large seed capsules, which could provide proteins if consumed by wild pigs along with the fleshy pulp. However, fruits serve primarily as a source of energy. Supplemental feeds (e.g., shelled corn) can be high in carbohydrates but low in proteins.

Like other wildlife species, protein intake is a critical component of the diet. High protein levels are necessary during gestation and lactation, and for adequate growth of piglets. If intake of crude protein falls below 15% of the diet, lactation can be significantly reduced and result in poor survival of piglets. Because protein tends to be the most limiting nutrient in terrestrial ecosystems, wild pigs will selectively forage for foods that are high in protein. It is this protein demand that causes pigs to be so destructive to some agricultural crops (e.g., peanuts, soybeans, etc.). Additionally, because animal matter has such a high protein content, wild pigs will opportunistically take advantage of whatever animal matter they can consume. Wild pigs may have to compensate by searching more for insect larvae and roots. A similar effect occurs during good mast years (Groot Bruinderink et al. 1994). Wild pigs may have to increase their animal intake to compensate for the low protein content of acorns (Loggins et al. 2002). For example, Barrett (1978) stated that dietary deficiencies in the summer months, especially for protein, markedly affected young and lactating pigs in the foothills subpopulation on the Dye Creek Ranch, California. Similar protein deficiencies occurred during the fall.

The time of greatest nutrient demand for wild pigs is during lactation and the last month of gestation. Lactation is considered to be the greatest nutrient demand realized by any mammalian species. Lactating sows require up to three times the energy/protein of non-breeding sows. If energetic requirements are not met by dietary intake, they must be met by mobilizing fat reserves, which can later lead to poor condition and negatively influence the chances of successful breeding during later litters. During the last month of gestation, pregnant sows require twice the digestible energy of non-breeding sows.

Wild Pigs

Effect of Diet on Productivity - The wild pig is a species that utilizes a wide variety of forage resources. Because they are generalist feeders, they can successfully survive in most any area as long as there is adequate water, and productivity of available habitats is not limiting to a large mammal. The productivity of wild pigs will ultimately be a function of availability of adequate nutrition to support their prolific breeding potential. Because their rate of reproduction is much greater than other large mammals, they tend to be particularly susceptible to climatic/landscape events (e.g., drought, mast failure) that negatively influence availability of food. Their high rate of reproduction can result in more animals than the habitat can sustain when forage availability drops significantly, and this can result in measurable declines in population size. However, their high rate of reproduction also ensures that populations will rapidly rebound when the nutritional environment returns to normal. Geisser and Reyer (2005) reported that food and temperature were important factors affecting the fluctuations in wild pig density. Enhanced food availability is likely to boost reproductive success through younger age at first reproduction, larger litter size and earlier onset of estrous within a season.

Summary

While our understanding of the food habits of wild pigs is generally sound, the impacts that wild pigs have on vegetative communities and animal species due to foraging is only poorly understood. Measurable impacts on native species of plants and animals have been documented, but the long-term impacts on local populations have yet to be thoroughly examined. A more complete understanding of these impacts will require long term studies and significant effort. It is in this area that the greatest gap in our knowledge regarding food habits of wild pigs exists.

Table 1. Percent composition of material by volume in wild pig diets from various locations.

Location	Percent Composition of Diet				Reference
	Plant	Fungi	Animal	Other ^a	
Doñana National Park, Spain	88 ^c	8	3	1	Abáigar 1993
Great Smoky Mountains National Park, NC and TN, USA	84.6-99.3 ^b	0-18.6 ^b	0.7-10.8 ^b	Trace	Ackerman et al. 1978
Davis Mountains, TX, USA	97.5 ^c	-	2.5 ^c	-	Adkins and Harveson. 2006
Horn Island, Gulf Islands National Seashore, MS, USA	77.5 ^c	3.8 ^c	18.8 ^c	-	Baron 1979
Dye Creek Ranch, Tehama County, CA, USA	98.4	-	1.6	-	Barrett 1978
Maurienne Valley, Savoie Department, France	92	1	1	6	Baubet et al. 2004
East Germany	95-96	-	4-5	-	Briedermann 1976
Auckland Island, New Zealand	63-72 ^d	-	28-37	-	Challies 1975
Auckland Island, New Zealand	63.1 ^{cd}	3.7	33.2	-	Chimera et al. 1995
Temperate Monte Desert Reserve of Ñacuñen, Mendoza, Argentina	95	-	5	-	Cuevas et al. 2007
Kipahulu Valley, Maui, HI, USA	93.2	-	6.8	-	Diong 1982
Varaita Valley, Cuneo Province, Italy	87.5	-	7.2	5.3	Durio et al. 1995
Area around Chernobyl powerplant, Polesie Region, Ukraine	91.3 ^c	~0.2 ^c	8.3 ^c	~0.2 ^c	Eriksson and Petrov 1995
Yturria Ranch, Willacy County, TX, USA	95.2	-	4.8	-	Everitt and Alaniz 1980
Herault Department, France	94	2	3	1	Fournier-Chambrillon et al. 1995
Natural Park of Aiguamolls de l'Emporda, Catalonia, Spain	94.0	-	5.6	<0.01	Giménez-Anaya et al. 2008
Northeastern and Western Poland	88.3	0.8	10.9	-	Genov 1981a
Island of Hawaii, HI, USA	93-96 ^{bc}	-	4-7 ^{bc}	-	Giffin 1970
Mendocino County, CA, USA	71.5 ^{cd}	-	28.5 ^c	-	Grover 1983
Poland	92.6	-	7.4	-	Haber 1966
Tellico Wildlife Management Area, TN, USA	89.4	-	6.4	4.2	Henry and Conley 1972
Natural Park of Aiguamolls de l'Emporda, Catalonia, Spain	91.9	-	8.1	Trace	Herrero et al. 2004

Wild Pigs

Table 1. Percent composition of material by volume in wild pig diets from various locations (Continued).

Location	Percent Composition of Diet				Reference
	Plant ^d	Fungi	Animal	Other ^a	
Great Smoky Mountains National Park, NC and TN, USA	98	-	2	-	Howe et al. 1981
Gipuzkoa and Bizbaia provinces, Spain	94.1	-	5.9	-	Irizar et al. 2004
Czechoslovakia	85.8	-	14.2	-	Janda 1958
National Park of Chrea, Algeria	95	-	1	4	Klaa 1992
Bialowieza Primeval Forest, USSR	95.7	-	4.3	-	Kozlo 1975
Bialowieza Primeval Forest, Poland	87.6	-	12.4	-	Lebedeva 1956
Södermanland, Sweden	86	-	14	-	Lemel 1999
Maremma Natural Park, Italy	86.3	-	13.7	-	Massei et al. 1996
Girilambone, New South Wales, Australia	82-86 ^b	-	13.9-17.7 ^b	-	Pavlov 1980
Monterey, San Luis Obispo and San Benito counties, CA, USA	80.9-94.2 ^b	-	5.8-19.1 ^b	-	Pine and Gerdes 1973
Bialowieza Primeval Forest, Poland	86.7	-	13.3	-	Sablina 1955
Great Smoky Mountains National Park, NC and TN, USA	99.1	-	0.3	0.2	Scott and Pelton 1975
South-central Chile	57.2	15.9	16.1	-	Skewes et al. 2007
Herault and Aude Departments, France	96.1	-	3.7	0.2	Sjarmidi et al. 1992
Aransas National Wildlife Refuge, TX, USA	75-83.9 ^b	1.7-14.6 ^b	16.1-25 ^b	-	Springer 1975
South Texas Plains, TX, USA	93	-	6.7	0.3	Taylor and Hellgren 1997
Urewera Ranges, North Island, New Zealand	70.9 ^c	0.8	28.3 ^c	-	Thomson and Challies 1988
Hobcaw Barony, SC, USA	83.0-97.4 ^{bc}	0.8-11.7 ^{bc}	1.3-5.6 ^{bc}	-	Wood and Roark 1980

^a Includes, debris, garbage, lichen, rocks/gravel, soil/sand, etc.

^b Annual, seasonal or location variation

^c Calculated from reference

^d Volumes also include some algae and/or fungi

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States.

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Plants			
Alismataceae			
<i>Sagittaria platyphylla</i> (delta arrowhead)	leaves, stems, and tubers	GA	Hanson and Karstad 1959
<i>Echinodorus rostratus</i> (burhead)	leaves and stems	TX	Everitt and Alaniz 1980
Alliaceae			
<i>Allium canadense</i> (wild onion)	leaves and stems	TX	Springer 1975
Amaranthaceae			
<i>Amaranthus blitoides</i> (creeping amaranth)	fruits and seeds	NC, TN	Scott and Pelton 1975
Anacardiaceae			
<i>Rhus diversiloba</i> (poison oak)	fruits, seeds and leaves	CA	Pine and Gerdes 1973, Barrett 1978
<i>Rhus integrifolia</i> (lemonade sumac)	fruits, seeds and stems	CA	Baber and Coblenz 1987
Apiaceae			
<i>Bowlesia incana</i> (hoary bowlesia)	leaves and stems	CA	Baber and Coblenz 1987
<i>Hydrocotyle</i> sp. (pennywort)	leaves and stems	TX	Springer 1975
<i>Hydrocotyle bonariensis</i> (largeleaf pennywort)	leaves and stems	MS	Baron 1979
Aquifoliaceae			
<i>Ilex opaca</i> (American holly)	fruits and seeds	NC, TN	Scott and Pelton 1975
Arecaceae			
<i>Sabal palmetto</i> (cabbage palm)	roots and fruits	MS	Baron 1979
<i>Serenoa repens</i> (saw palmetto)	fronds	FL	Thompson 1977
Asteraceae			
<i>Ambrosia psilostachya</i> (western ragweed)	leaves and stems	TX	Everitt and Alaniz 1980
<i>Aster</i> sp. (aster)	leaves and stems	NC, TN	Ackerman et al. 1978
<i>Aster divaricatus</i> (eastern star)	leaves and stems	NC, TN	Howe et al. 1981
<i>Carduus</i> sp. (thistle)	leaves and stems	SC	Wood and Roark 1980
<i>Centaurea melitensis</i> (Maltas knapweed)	leaves and stems	CA	Baber and Coblenz 1987
<i>Cirsium</i> sp. (thistle)	seeds and leaves	CA	Pine and Gerdes 1973
<i>Eupatorium rugosum</i> (white snakeroot)	leaves, stems and roots	NC, TN	Conley et al. 1972, Scott and Pelton 1975, Ackerman et al. 1978
<i>Helianthus</i> sp. (sunflower)	leaves and stems	TX	Ilse and Hellgren 1995
<i>Prenanthes</i> sp. (rattlesnakeroot)	leaves and stems	NC, TN	Ackerman et al. 1978
<i>Prenanthes altissima</i> (tall rattlesnakeroot)	leaves and stems	NC, TN	Howe et al. 1981
<i>Solidago curtisii</i> (mountain decumbent goldenrod)	leaves and stems	NC, TN	Howe et al. 1981

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Sonchus asper</i> (prickly sowthistle)	leaves and stems	CA	Baber and Coblenz 1987
Balsaminaceae			
<i>Impatiens capensis</i> (jewelweed)	roots	SC	Wood and Roark 1980
Brassicaceae			
<i>Brassica napus</i> (turnip)	roots	TN	Conley et al. 1972
<i>Capsella bursa-pastoris</i> (shepard's purse)	leaves and stems	CA	Baber and Coblenz 1987
<i>Dentaria</i> sp. (toothwort)	roots	TN	Conley et al. 1972
<i>Lepidium nitidum-nitidum</i> (tongue pepperwood)	leaves and stems	CA	Baber and Coblenz 1987
<i>Rorippa nasturtium-aquaticum</i> (watercress)	leaves and stems	CA	Baber and Coblenz 1987
<i>Sisymbrium officinale</i> (common hedgemustard)	leaves and stems	CA	Baber and Coblenz 1987
Cactaceae			
<i>Opuntia</i> sp. (prickly pear cactus)	leaves, stems, fruits and seeds	CA, MS, SC, TX	Springer 1975, Baron 1979, Baber and Coblenz 1987, Hellgren and Holzem 1992, Taylor and Hellgren 1997, J. J. Mayer, unpubl. data
Caprifoliaceae			
<i>Sambucus mexicana</i> (Mexican elder)	fruits and seeds	CA	Baber and Coblenz 1987
Caryophyllaceae			
<i>Stellaria pubera</i> (great chick weed)	leaves and stems	NC, TN	Ackerman et al. 1978, Howe et al. 1981
Chenopodiaceae			
<i>Salsola kali</i> (common Russian thistle)	leaves and stems	CA	Baber and Coblenz 1987
Convolvulaceae			
<i>Ipomoea stolonifera</i> (fiddle-leaf morning glory)	leaves and stems	MS	Baron 1979
Cornaceae			
<i>Nyssa sylvatica</i> (water tupelo)	fruits and seeds	SC	Wood and Roark 1980
<i>Nyssa sylvatica</i> var. <i>biflora</i> (swamp tupelo)	seedling roots	SC	Mayer et al 2000
Cyperaceae			
<i>Carex</i> sp. (sedge)	leaves and stems	NC, TN	Ackerman et al. 1978, Howe et al. 1981
<i>Cypernius esculentus</i> (chufa)	tubers and roots	TN	Conley et al. 1972

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Cyperus</i> sp. (sedges)	leaves, stems, tubers and roots	MS, SC, TX	Kurz 1971, Springer 1975, Baron 1979, Everitt and Alaniz 1980, Wood and Roark 1980
<i>Cyperus esculentus</i> (nut grass)	roots	SC	Wood and Roark 1980
<i>Eleocharis</i> sp. (spikesedge)	roots	MS, TX	Springer 1975, Baron 1979
<i>Heleocharis palustris</i> (spikerush)	fruits and seeds	CA	Pine and Gerdes 1973
<i>Scirpus americanus</i> (three-square bulrush)	roots	TX	Springer 1975
<i>Scirpus californicus</i> (California bulrush)	roots	TX	Springer 1975
<i>Tradescantia micrantha</i> (cherisse)	leaves and stems	TX	Everitt and Alaniz 1980
Dioscoreaceae			
<i>Dioscorea</i> sp. (wild yam)	roots	NC, TN	Conley et al. 1972, Scott and Pelton 1975
<i>Dioscorea batatas</i> (Chinese yam)	roots and tubers	NC, TN	Ackerman et al. 1978
Dryopteridaceae			
<i>Cystopteris bulbifera</i> (bulbet-fern)	roots	TN	Conley et al. 1972
<i>Polystichum acrostichoides</i> (Christmas fern)	roots and shoots	NC, TN	Conley et al. 1972, Scott and Pelton 1975
Ebenaceae			
<i>Diospyros texana</i> (Texas persimmon)	fruits, seeds, leaves and stems	TX	Hellgren and Holzem 1992, Ilse and Hellgren 1995
<i>Diospyros virginiana</i> (common persimmon)	fruits and seeds	SC, TX	Springer 1975, J. J. Mayer, unpubl. data
Ericaceae			
<i>Arctostaphylos</i> sp. (manzanita)	fruits and seeds	CA	Pine and Gerdes 1973, Barrett 1978, Baber and Coblenz 1987, de Nevers 1993
<i>Arctostaphylos manzanita</i> (manzanita)	fruits and seeds	CA	Grover 1983
<i>Gaylussacia</i> sp. (huckleberry)	fruits and seeds	NC, TN	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975
<i>Vaccinium</i> sp. (blueberry)	leaves, stems, fruits and seeds	NC, TN	Conley et al. 1972, Scott and Pelton 1975, Howe et al. 1981
<i>Vaccinium corymbosum</i> (highbush blueberry)	leaves, stems, fruits and seeds	NC, TN	Ackerman et al. 1978
<i>Vaccinium hirsutum</i> (hairy blueberry)	leaves, stems, fruits and seeds	NC, TN	Ackerman et al. 1978

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Fabaceae			
<i>Acacia berlandieri</i> (guajillo)	fruits and seeds	TX	Hellgren and Holzem 1992, Taylor and Hellgren 1997
<i>Acacia farnesiana</i> (huisache)	fruits and seeds	TX	Hellgren and Holzem 1992
<i>Edicago hispida</i> (bur clover)	fruits, seeds and leaves	CA	Pine and Gerdes 1973
<i>Lotus argophylus ornithopos</i> (silver deervetch)	leaves and stems	CA	Baber and Coblentz 1987
<i>Lotus strigosus</i> (bristle deervetch)	leaves and stems	CA	Baber and Coblentz 1987
<i>Medicago polymorpha</i> (burclover)	leaves and stems	CA	Baber and Coblentz 1987
<i>Melilotus alba</i> (wild sweet clover)	leaves	TN	Conley et al. 1972
<i>Trifolium repens</i> (white clover)	leaves and stems	CA	Barrett 1978
<i>Trifolium</i> sp. (clover)	leaves and stems	CA, NC, TN	Conley et al. 1972, Pine and Gerdes 1973, Scott and Pelton 1975, Ackerman et al. 1978
<i>Acacia farnesiana</i> (huisache)	fruits and seeds	TX	Hellgren and Holzem 1992
<i>Lithocarpus densiflorum</i> (tanbark oak)	fruits and seeds	CA	Pine and Gerdes 1973
<i>Quercus</i> sp. (oaks)	fruits, seeds and leaves	CA, GA, NC, SC, TN, TX	Hanson and Karstad 1959, Kurz 1971, Conley et al. 1972, Henry and Conley 1972, Pine and Gerdes 1973, Scott and Pelton 1975, Springer 1975, Ackerman et al. 1978, Barrett 1978, Wood and Roark 1980, Grover 1983, Baber and Coblentz 1987, de Nevers 1993, Loggins et al. 2002
<i>Quercus agrifolia</i> (coast live oak)	fruits and seeds	CA	Pearl 1993
<i>Quercus douglassi</i> (blue oak)	fruits and seeds	CA	Chipping 1993
<i>Quercus dumosa</i> (scrub oak)	fruits and seeds	CA	Pearl 1993
<i>Quercus falcata</i> var. <i>pagodaefolia</i> (cherrybark oak)	seedling roots	SC	Mayer et al 2000
<i>Quercus lobata</i> (valley oak)	fruits and seeds	CA	Chipping 1993
<i>Quercus michauxii</i> (swamp chestnut oak)	seedling roots	SC	Mayer et al 2000
<i>Quercus virginiana</i> (live oak)	fruits and seeds	TX	Everitt and Alaniz 1980
Geraniaceae			
<i>Erodium</i> sp. (<i>filaree</i>)	leaves and stems	CA	Barrett 1978, Pine and Gerdes 1973, Baber and Coblentz 1987
<i>Geranium maculatum</i> (spotted geranium)	leaves and stems	NC, TN	Ackerman et al. 1978

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Hamamelidaceae			
<i>Liquidambar styraciflua</i> (sweetgum)	roots	TN	Conley et al. 1972
Hydrophyllaceae			
<i>Pholistoma racemosa</i> (racemed fiestaflower)	leaves and stems	CA	Baber and Coblenz 1987
Juglandaceae			
<i>Carya</i> sp. (hickories)	fruits and seeds	NC, SC, TN	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Wood and Roark 1980
<i>Carya aquatica</i> (water hickory)	seedling roots	SC	Mayer et al 2000
<i>Carya illinoensis</i> (pecan)	fruits and seeds	SC	J. J. Mayer, unpubl. data
<i>Juglans nigra</i> (black walnut)	fruits	NC, SC, TN	Conley et al. 1972, Scott and Pelton 1975, Ackerman et al. 1978, J. J. Mayer, unpubl. data
Juncaceae			
<i>Juncus effuses</i> (common rush)	roots	SC	J. J. Mayer, unpubl. data
Lamiaceae			
<i>Marrubium vulgare</i> (common horehound)	leaves and stems	CA	Baber and Coblenz 1987
Lauraceae			
<i>Persea americana</i> (avocado)	fallen ripe fruits	FL	J. J. Mayer, unpubl. data
<i>Umbellularia californica</i> (California bay fruit)	fruits and seeds	CA	Pine and Gerdes 1973
Leguminosae			
<i>Prosopis</i> sp. (mesquite)	fruits and seeds	TX	Hellgren and Holzem 1992, Taylor and Hellgren 1997
Liliaceae			
Liliaceae (lily - general)	corms, bulbs and leaves	CA	Pine and Gerdes 1973, de Nevers 1993
<i>Brodiaea</i> sp. (<i>brodiaea</i>)	corms	CA	Pine and Gerdes 1973
<i>Dichelostemma pulchellum</i> (purplehead brodiaea)	roots	CA	Baber and Coblenz 1987
<i>Disporum lanuginosum</i> (yellow fairy bells)	leaves and stems	NC, TN	Howe et al. 1981
<i>Erythronium americanum</i> (fawn lilly)	roots and tubers	NC, TN	Ackerman et al. 1978, Howe et al. 1981
<i>Lilium</i> sp. (lily)	leaves and stems	NC, TN	Ackerman et al. 1978
<i>Smilacina racemosa</i> (false Solomon's seal)	leaves and stems	NC, TN	Ackerman et al. 1978

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States
(Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Magnoliaceae <i>Liriodendron tulipifera</i> (tulip poplar)	leaves, stems, fruits and seeds	NC, TN	Scott and Pelton 1975
Malvaceae <i>Malva parviflora</i> (little mallow) <i>Malvastrum</i> sp. (mallow)	leaves and stems leaves and stems	CA TX	Baber and Coblenz 1987 Ilse and Hellgren 1995
Marsileaceae <i>Marsilea macropoda</i> (water clover)	leaves and stems	TX	Everitt and Alaniz 1980
Nelumbonaceae <i>Nelumbo lutea</i> (water lotus)	exposed rhizomes	SC	Whicker 1991
Nymphaeaceae <i>Nymphaea odorata</i> (water lilly)	exposed rhizomes	SC	Whicker 1991
Oleaceae <i>Fraxinus americana</i> (white ash)	fruits and seeds	TN	Henry and Conley 1972
Orchidaceae <i>Calypso bulbosa</i> (Calypso orchid)	bulbs	CA	Chipping 1993
Oxalidaceae <i>Oxalis montana</i> (mountain woodsorrel)	leaves and stems	NC, TN	Ackerman et al. 1978
Phytolaccaceae <i>Phytolacca americana</i> (pokeweed)	roots	TN	Conley et al. 1972
Pinaceae <i>Pinus</i> sp. (<i>pinus</i>)	leaves, roots and bark	MS, NC, SC, TN	Sweeney 1970, Henry and Conley 1972, Scott and Pelton 1975, Ackerman et al. 1978, Baron 1979
<i>Pinus elliotti</i> (slash pines)	roots and bark	SC	Mayer et al 2000
<i>Pinus palustris</i> (longleaf pines)	roots and bark	GA, SC	Hanson and Karstad 1959, Mayer et al 2000
<i>Pinus rigida</i> (pitch pines)	roots and bark	TN	Conley et al. 1972
<i>Pinus strobus</i> (white pine)	roots	TN	Conley et al. 1972
<i>Pinus taeda</i> (loblolly pines)	roots and bark	SC	Mayer et al 2000
<i>Tsuga canadensis</i> (eastern hemlock)	leaves, stems and roots	NC, TN	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975
Plantaginaceae <i>Plantago erecta</i> (dotseed plantain)	leaves and stems	CA	Baber and Coblenz 1987

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Poaceae			
Poaceae (grass - general)	leaves and stems	CA, NC, TN	Pine and Gerdes 1973, Scott and Pelton 1975, Barrett 1978, Grover 1983, de Nevers 1993
<i>Agrostis diegoensis</i> (thin bentgrass)	leaves and stems	CA	Baber and Coblenz 1987
<i>Andropogon maritimus</i> (beard grass)	leaves and stems	MS	Baron 1979
<i>Arundinaria gigantia</i> (switch cane)	leaves	SC	J. J. Mayer, unpubl. data
<i>Avena barbata</i> (wild oat)	fruits, seeds leaves and stems	CA	Pine and Gerdes 1973, Barrett 1978, Baber and Coblenz 1987
<i>Avena fatua</i> (wild oat)	fruits, seeds leaves and stems	CA	Pine and Gerdes 1973
<i>Avena sativa</i> (oats)	seed	TN	Conley et al. 1972
<i>Bromus</i> sp. (annual brome grass)	leaves and stems	CA	Baber and Coblenz 1987
<i>Bromus mollis</i> (soft chess)	fruits and seeds	CA	Barrett 1978
<i>Bromus rigidus</i> (rip-gut)	fruits and seeds	CA	Pine and Gerdes 1973
<i>Cynodon dactylon</i> (Bermuda grass)	leaves, stems and roots	SC, TX	Springer 1975, Wood and Roark 1980
<i>Dactylis glomerata</i> (orchard grass)	leaves	TN	Conley et al. 1972
<i>Digitaria</i> sp. (crabgrass)	roots	SC	Wood and Roark 1980
<i>Digitaria adscendens</i> (common crabgrass)	leaves and stems	TX	Springer 1975
<i>Eremochloa</i> sp. (centipede grass)	roots	SC	J. J. Mayer, unpubl. data
<i>Festuca</i> sp. (fescue)	seeds and leaves	CA, TN	Conley et al. 1972, Barrett 1978
<i>Holcus lanatus</i> (velvet grass)	leaves	TN	Conley et al. 1972
<i>Hordeum glaucum</i> (glaucous barley)	leaves and stems	CA	Baber and Coblenz 1987
<i>Hordeum leporinum</i> (rabbit barley)	leaves and stems	CA	Baber and Coblenz 1987
<i>Hordeum vulgare</i> (barley)	fruits and seeds	CA	Pine and Gerdes 1973
<i>Lamarkia aurea</i> (common goldentop)	leaves and stems	CA	Baber and Coblenz 1987
<i>Leersia hexandra</i> (cutgrass)	leaves and stems	TX	Springer 1975
<i>Lolium</i> sp. (rye grass)	fruits, seeds, and fresh shoots and rhizomes	CA, SC	Pine and Gerdes 1973, J. J. Mayer, unpubl. data
<i>Melica imperfecta</i> (coastrange melic)	leaves and stems	CA	Baber and Coblenz 1987
<i>Muhlenbergia microsperma</i> (littleseed muhly)	leaves and stems	CA	Baber and Coblenz 1987
<i>Panicum</i> sp. (panic grasses)	leaves and stems	SC	Wood and Roark 1980
<i>Panicum miliaceum</i> (millet)	seed heads and fresh shoots	SC	J. J. Mayer, unpubl. data
<i>Panicum repens</i> (torpedogras)	leaves and stems	MS	Baron 1979
<i>Panicum tenerum</i> (bluejoint panicgrass)	leaves and stems	MS	Baron 1979
<i>Paspalum floridanum</i> (Florida paspalum)	leaves and stems	MS	Baron 1979
<i>Paspalum lividum</i> (longtom)	leaves and stems	TX	Everitt and Alaniz 1980

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States
(Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Paspalum notatum</i> (bahia grass)	roots	SC	J. J. Mayer, unpubl. data
<i>Poa</i> sp. (bluegrass)	leaves	TN	Conley et al. 1972
<i>Poa annua</i> (annual blugrass)	leaves and stems	CA	Baber and Coblenz 1987
<i>Poa scabrella</i> (pine blugrass)	leaves and stems	CA	Baber and Coblenz 1987
<i>Sorghum</i> sp. (sorghum grass)	fruits and seeds	TX	Springer 1975
<i>Sorghum halepense</i> (Johnson grass)	roots	SC	Wood and Roark 1980
<i>Sorghum vulgare</i> (dwarf milo)	seed heads	TN	Conley et al. 1972
<i>Spartina cynosuroides</i> (big cordgrass)	roots	SC	Wood and Roark 1980
<i>Sporobolus</i> sp. (dropseed)	leaves and stems	TX	Ilse and Hellgren 1995
<i>Stenotaphrum secundatum</i> (St. Augustine grass)	leaves and stems	TX	Springer 1975
<i>Stipa</i> sp. (needlegrass)	leaves and stems	CA	Baber and Coblenz 1987
<i>Triticum</i> sp. (<i>winter wheat</i>)	seed heads and fresh shoots	SC	J. J. Mayer, unpubl. data
<i>Triticum aestivum</i> (wheat)	leaves	TN	Conley et al. 1972
<i>Vulpia megalura</i> (foxtail annual fescue)	leaves and stems	CA	Baber and Coblenz 1987
<i>Zea mays</i> (corn)	leaves, stems, fruits and seeds	GA, SC, TN, TX	Conley et al. 1972, Taylor and Hellgren 1997, J. J. Mayer, unpubl. data
<i>Zizania aquatica</i> (wild rice)	leaves, stems, tubers and roots	SC	Wood and Roark 1980
<i>Zizaniopsis maliacea</i> (southern wild rice)	leaves, stems, tubers and roots	SC	Wood and Roark 1980
Polemoniaceae			
<i>Gila angelensis</i> (Australian saltgrass)	leaves and stems	CA	Baber and Coblenz 1987
Polygonaceae			
<i>Rumex acetosella</i> (common sheep sorrel)	leaves and stems	NC, TN	Ackerman et al. 1978
Pontederiaceae			
<i>Pontederia cordata</i> (pickerelweed)	leaves and stems	GA, TX	Hanson and Karstad 1959, Springer 1975
Portulacaceae			
<i>Claytonia perfoliata</i> (miner's lettuce)	leaves and stems	CA	Baber and Coblenz 1987
<i>Claytonia virginica</i> (spring beauty)	corms, leaves and stems	NC, TN	Ackerman et al. 1978, Howe et al. 1981
<i>Montia perfoliata</i> (miner's lettuce)	seeds and leaves	CA	Pine and Gerdes 1973
<i>Portulaca mundula</i> (mossrose)	leaves and stems	TX	Everitt and Alaniz 1980
Ranunculaceae			
<i>Thalictrum</i> sp. (meadow rue)	leaves and stems	NC, TN	Ackerman et al. 1978

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Rosaceae			
<i>Amelanchier laevis</i> (serviceberry)	fruits and seeds	NC, TN	Ackerman et al. 1978, Howe et al. 1981
<i>Chanomeles lagenaria</i> (Japanese quince)	fruits and seeds	NC, TN	Ackerman et al. 1978
<i>Crataegus canadensis</i> (hawthorn)	fruit	TN	Conley et al. 1972
<i>Malus</i> sp. (wild and domestic apple, crabapple)	fruits and seeds	NC, TN	Scott and Pelton 1975, Ackerman et al. 1978
<i>Photinia arbutifolia</i> (Christmasberry or toyon)	fruits, seeds and stems	CA	Pine and Gerdes 1973, Baber and Coblenz 1987
<i>Potentilla</i> sp. (cinquefoil)	leaves and stems	NC, TN	Ackerman et al. 1978
<i>Prunus</i> sp. (common plum)	fruits and seeds	NC, SC, TN	Kurz 1971, Scott and Pelton 1975
<i>Prunus ilicifolia lyonii</i> (Catalina cherry)	fruits and seeds	CA	Baber and Coblenz 1987
<i>Prunus illicifolia</i> (holly-leaf cherry)	fruits and seeds	CA	Pine and Gerdes 1973
<i>Pyrus malus</i> (domestic apple)	fruit	TN	Conley et al. 1972
<i>Rubus</i> sp. (blackberry)	fruits, tubers and roots	SC, TN	Kurz 1971, Conley et al. 1972, Scott and Pelton 1975, Wood and Roark 1980
<i>Rubus canadensis</i> (smooth blackberry)	fruits, tubers and roots	NC, TN	Howe et al. 1981
Rubiaceae			
<i>Galim aparine</i> (catchweed bedstraw)	leaves and stems	CA	Baber and Coblenz 1987
<i>Mitchella repens</i> (partridge berry)	fruits	TN	Conley et al. 1972
Ruscaceae			
<i>Polygonatum biflora</i> (Solomon's seal)	leaves and stems	NC, TN	Ackerman et al. 1978
Santalaceae			
<i>Pyrularia pubera</i> (buffalo-nut)	fruits and seeds	NC, TN	Scott and Pelton 1975
Saururaceae			
<i>Saururus cernuus</i> (lizard's tail)	roots	SC	Wood and Roark 1980
Scrophulariaceae			
<i>Bacopa monnieri</i> (water hyssop)	leaves and stems	TX	Springer 1975
Smilacaceae			
<i>Smilax</i> sp. (greenbrier or catbrier)	tubers and roots	NC, SC, TN, TX	Kurz 1971, Conley et al. 1972, Scott and Pelton 1975, Springer 1975
<i>Smilax rotundifolia</i> (roundleaf greenbrier)	leaves and stems	NC, TN	Ackerman et al. 1978

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States
(Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Solanaceae			
<i>Datura</i> sp. (thorn apple)	fruit	TN	Conley et al. 1972
Styracaceae			
<i>Halesia carolina</i> (silverbell)	fruit	TN	Conley et al. 1972
Trilliaceae			
<i>Trillium</i> sp. (trillium)	leaves, stems and roots	NC, TN	Ackerman et al. 1978
<i>Trillium erectum</i> (red trillium)	leaves, stems and roots	NC, TN	Howe et al. 1981
Typhaceae			
<i>Typha</i> sp. (cattail)	roots	CA, TX	Springer 1975, Baber and Coblentz 1987
<i>Typha latifolia</i> (common cattail)	exposed rhizomes	SC	Whicker 1991
Urticaceae			
<i>Laportea canadensis</i> (wood nettle)	leaves and stems	NC, TN	Scott and Pelton 1975, Ackerman et al. 1978, Howe et al. 1981
<i>Urtica chamaedryoides</i> (nettle)	leaves and stems	TX	Everitt and Alaniz 1980
Verbenaceae			
<i>Phyla incisa</i> (frog-fruit)	leaves and stems	TX	Springer 1975, Everitt and Alaniz 1980
<i>Phyla nodiflora</i> (turkey-tangle)	leaves and stems	TX	Everitt and Alaniz 1980
Violaceae			
<i>Viola</i> sp. (violet)	leaves, stems, tubers and roots	NC, TN	Conley et al. 1972, Scott and Pelton 1975, Ackerman et al. 1978, Howe et al. 1981
Vitaceae			
<i>Vitis</i> sp. (<i>muscadine or wild grape</i>)	fruits and seeds	NC, SC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Springer 1975, Wood and Roark 1980, Kroll 1986
Fungi			
Fungi (mushrooms)	fruiting body	CA, MS, NC, SC, TN, TX	Pine and Gerdes 1973, Springer 1975, Ackerman et al. 1978, Baron 1979, Wood and Roark 1980
Animals			
Invertebrates			

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Annelida			
Hirudinidae (leech)	entire organism	TX	Springer 1975
Oligochaeta (earthworms)	entire organism	CA, NC, TN	Ackerman et al. 1978, de Nevers 1993
Lumbricidae (earthworms)	entire organism	SC	Wood and Roark 1980
<i>Annelida sp.</i> (earthworm)	entire organism	CA, NC, TN, TX	Pine and Gerdes 1973, Scott and Pelton 1975, Springer 1975, Barrett 1978
<i>Lumbricoides sp.</i> (earthworms)	entire organism	GA	Hanson and Karstad 1959
<i>Lumbricus sp.</i> (earthworms)	entire organism	CA, TN TX	Conley et al. 1972, Henry and Conley 1972, Kroll 1986, Loggins et al. 2002
<i>Pheretima diffringens</i> (earthworms)	entire organism	GA	Hanson and Karstad 1959
Arthropoda			
Arthropoda (arthropods - general)	entire organism	TX	Ilse and Hellgren 1995
Arachnida			
Aranea (spider)	entire organism	CA	Grover 1983
Ixodoidea (tick)	entire organism	TX	Springer 1975
Crustacea			
Decapoda (crayfish)	entire organism	NC, TN	Ackerman et al. 1978
Astacidae (crayfish)	entire organism	TN	Conley et al. 1972, Henry and Conley 1972
<i>Cambarus sp.</i> (crayfish)	entire organism	TX	Springer 1975
Brachyura (crab)	entire organism	MS	Baron 1979
<i>Callinectes sapidus</i> (blue crab)	entire organism	MS	Baron 1979
<i>Uca sp.</i> (fiddler crab)	entire organism	GA, SC	Hanson and Karstad 1959, Wood and Roark 1980
Insecta			
Insecta (insects - general)	larvae/adults/entire organism	CA, MS, TN	Stegeman 1938, Barrett 1978, Baron 1979, Grover 1983, Baber and Coblenz 1987
Alleculidae (comb-clawed beetles)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Bibionidae (march flies)	larvae/entire organism	NC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975, Ackerman et al. 1978
Caelifera (grasshopper)	entire organism	CA, TX	Springer 1975, Grover 1983
<i>Brachystola magna</i> (lubber grasshopper)	entire organism	GA	Hanson and Karstad 1959
Calliphoridae (blow flies)	larvae/entire organism	TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Carabidae (ground beetles)	entire organism	NC, TN	Ackerman et al. 1978, Howe et al. 1981
Coleoptera (beetles - general)	adult and larvae/entire organism	CA, MS, NC, SC, TN	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Baron 1979, Wood and Roark 1980, Grover 1983
Corydalidae (hellgrammites)	larvae/entire organism	NC, TN	Ackerman et al. 1978
Curculionidae (true or snout weevils)	larvae/entire organism	NC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975, Ackerman et al. 1978
Diptera (flies)	larvae/adult/entire organism	NC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Springer 1975, Howe et al. 1981
Dolichopodidae (long-legged flies)	entire organism	NC, TN	Ackerman et al. 1978
Elateridae (click beetles)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Empididae (dance flies)	entire organism	NC, TN	Ackerman et al. 1978
Formicidae (ants - general)	entire organism	NC, TN	Ackerman et al. 1978
Geometridae (measuring worms)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
<i>Helicoverpa zea</i> (corn earworm)	larvae/entire organism	NC, TN	Ackerman et al. 1978
Lepidoptera (moths and butterflies)	larvae, pupae/entire organism	TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975, Taylor and Hellgren 1997
Meloidae (blister beetles)	entire organism	NC, TN	Ackerman et al. 1978
Mutillidae (mutillid wasps)	adult/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Noctuidae (miller moths)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Odonata (dragonflies and damsel flies)	larvae/entire organism	TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975
Phasmidae (walking sticks, stick insects)	entire organism	NC, TN	Ackerman et al. 1978
Phengodidae (glowworms)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Rhagionidae (snipe flies)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Scarabacidae (lamellicron beetles)	larvae/entire organism	SC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Springer 1975, Wood and Roark 1980
Sialidae (alderflies)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Sphingidae (hawkmoths)	larvae/entire organism	NC, TN	Ackerman et al. 1978

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
Tabanidae (deer flies)	larvae/entire organism	NC, TN	Conley et al. 1972, Henry and Conley 1972, Ackerman et al. 1978
Tenebrionidae (darkling beetles)	larvae/entire organism	NC, TN	Conley et al. 1972, Henry and Conley 1972, Ackerman et al. 1978
Tipulidae (crane flies)	larvae/entire organism	NC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Springer 1975, Ackerman et al. 1978
Trupaneidae (fruit flies)	larvae/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Myriapoda			
Diplopoda (millipedes)	adult/entire organism	TN	Conley et al. 1972, Henry and Conley 1972
Juliformia (millipede)	entire organism	NC, TN	Ackerman et al. 1978
Polydesmoidae (millipedes)	entire organism	NC, TN	Ackerman et al. 1978
Chilopoda (centipedes)	entire organism	CA, NC, TN, TX	Conley et al. 1972, Henry and Conley 1972, Scott and Pelton 1975, Springer 1975, de Nevers 1993
Geophilidae (centipedes)	entire organism	SC	Wood and Roark 1980
Scolopendromorpha (centipedes)	entire organism	NC, TN	Ackerman et al. 1978
Scolopendridae (centipedes)	entire organism	SC	Wood and Roark 1980
Mollusk			
Gastropoda (snails)	entire organism	NC, TN	Ackerman et al. 1978
Polygriidae (land snails)	entire organism	NC, TN	Howe et al. 1981
Pelecypoda (clams and mussels)	entire organism	SC	Wood and Roark 1980
<i>Elliptio icterina</i> (variable spike mussel)	entire organism	SC	Zengel and Conner 2008
<i>Uniomorus carolinianus</i> (Florida pondhorn)	entire organism	SC	Zengel and Conner 2008
Nematode			
Nematoda (roundworms)	entire organism	MS, NC, TN	Ackerman et al. 1978, Baron 1979
Vertebrates			
Fish			
Osteichthyes (fish - general)	carrion	MS	Baron 1979
<i>Gambusia</i> sp. (topminnows)	entire organism	TX	Springer 1975
Amphibians			
Anura (frogs - general)	entire organism	GA, TN	Stegeman 1938, Hanson and Karstad 1959
<i>Hyla</i> sp. (tree frog)	entire organism	GA	Jolly et al. In Press

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Pseudacris regilla</i> (Pacific treefrog)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Rana berlandieri</i> (Rio Grande leopard frog)	entire organism	TX	Springer 1975
<i>Rana pipiens shenocephala</i> (southern leopard frog)	entire organism	SC	Wood and Roark 1980
<i>Rana sylvatica</i> (wood frog)	eggs	TN	Conley et al. 1972
<i>Scaphiopus holbrooki</i> (spadefoot toad)	entire organism	GA	Jolly et al. In Press
Caudata (salamanders - general)	entire organism	NC, TN	Scott and Pelton 1975, Ackerman et al. 1978
<i>Ambystoma maculatum</i> (spotted salamander)	entire organism	SC	Sweeney 1970
<i>Desmognathus ochrophaeus carolinensis</i> (Carolina mountain dusky salamander)	entire organism	NC, TN	Ackerman et al. 1978
<i>Eurycea bislineata wilderae</i> (Blue Ridge two-lined salamander)	entire organism	NC, TN	Ackerman et al. 1978
<i>Leurognathus marmoratus intermedius</i> (shovel-nosed salamander)	entire organism	NC, TN	Ackerman et al. 1978
Plethodontidae (lungless salamanders)	entire organism	NC, TN	Howe et al. 1981
<i>Plethodon cinereus cinereus</i> (red-backed salamander)	entire organism	NC, TN	Ackerman et al. 1978
<i>Plethodon glutinosus</i> (slimy salamander)	entire organism	SC	Sweeney 1970
<i>Plethodon jordani jordani</i> (Jordan's salamander)	entire organism	NC, TN	Ackerman et al. 1978
<i>Plethodon wrighti</i> (pygmy salamander)	entire organism	NC, TN	Ackerman et al. 1978
<i>Pseudotriton ruber schencki</i> (black-chinned red salamander)	entire organism	NC, TN	Ackerman et al. 1978
Reptiles			
<i>Alligator mississippiensis</i> (American alligator)	eggs	FL, LA	Neill 1971, McIlhenny 1976, Mazzotti and Brandt 1994
Testudines (turtle - general)	eggs, hatchlings, entire organism	GA, NC, TN	Hanson and Karstad 1959, Ackerman et al. 1978
<i>Caretta caretta</i> (loggerhead sea turtle)	eggs and hatchlings	FL, GA	Thompson 1977, Mayer and Brisbin 1995, Hayes et al. 1996
<i>Chelonia mydas</i> (Atlantic green turtle)	eggs and hatchlings	FL	NMFS and USFWS 1991
<i>Gopherus berlandieri</i> (Texas tortoise)	entire organism	TX	Taylor and Hellgren 1997
<i>Lepidochelys kempii</i> (Kemp's Ridley sea turtle)	eggs	TX	Diaz 2008

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Terrapene carolina carolina</i> (eastern box turtle)	shell fragment	NC, TN	Ackerman et al. 1978
Lacertilia (lizard - general)	entire organism	TN	Stegeman 1938
<i>Anolis carolinensis</i> (green anole)	entire organism	GA, SC	Wood and Roark 1980, Jolly et al. In Press
<i>Cnemidophorus sexlineatus</i> (prairie racerunner lizard)	entire organism	TX	Taylor and Hellgren 1997
<i>Gerrhonotus multicarinatus</i> (alligator lizard)	entire organism	CA	de Nevers 1993
<i>Ophisaurus ventralis</i> (eastern glass lizard)	entire organism	SC	Wood and Roark 1980
<i>Phrynosoma cornutum</i> (Texas horned lizard)	entire organism	TX	Taylor and Hellgren 1997
<i>Sceloporus occidentalis</i> (western fence lizard)	entire organism	CA	Grover 1983
<i>Sceloporus undulatus</i> (eastern fence lizard)	entire organism	GA	Jolly et al. In Press
<i>Xantusia riversiana</i> (island night lizard)	entire organism	CA	National Fish and Wildlife Laboratory 1980
Serpentes (snakes - general)	entire organism	GA, MS, NC, SC, TN, TX	Hanson and Karstad 1959, Sweeney 1970, Scott and Pelton 1975, Springer 1975, Ackerman et al. 1978, Baron 1979
<i>Coluber constrictor</i> (eastern racer)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Contia tenuis</i> (sharp-tailed snake)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Crotalus</i> sp. (rattlesnake)	entire organism	CA	Grover 1983
<i>Crotalus viridis</i> (western rattlesnake)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Diadophis punctatus</i> (ringneck snake)	entire organism	CA	de Nevers 1993
<i>Storeria occipitomaculata</i> (red-bellied snake)	entire organism	GA	Jolly et al. In Press
<i>Thamnophis sirtalis</i> (eastern garter snake)	entire organism	SC	Wood and Roark 1980
Birds			
Aves (birds - general)	entire organism, carrion	MS, NC, TN, TX	Scott and Pelton 1975, Springer 1975, Ackerman et al. 1978, Baron 1979
<i>Bonasa umbellus</i> (ruffed grouse)	eggs	TN	Henry 1969
<i>Callipepla californica</i> (California quail)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Colinus virginianus</i> (northern bobwhite)	eggs	TX	Tolleson et al. 1993
<i>Geococcyx californianus</i> (roadrunner)	entire organism	TX	Taylor and Hellgren 1997

Wild Pigs

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Melanerpes formicivorus</i> (acorn woodpecker)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Meleagris gallopavo</i> (wild turkey)	eggs and entire organism	SC, TN, TX	Henry 1969, J. J. Mayer, unpubl. data
<i>Phalaenoptilus nuttallii</i> (common poorwill)	carrion	CA	Wilcox and Van Vuren 2009
<i>Pipilo crissalis</i> (California towhee)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Richmondia cardinalis</i> (cardinal)	entire organism	TX	Taylor and Hellgren 1997
<i>Thryomanes bewickii</i> (Bewick's wren)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Zenaidura macroura</i> (mourning dove)	carrion	TX	Taylor and Hellgren 1997
Mammals			
Mammalia (mammals - general)	entire organism, carrion	CA, NC, TN	Scott and Pelton 1975, Ackerman et al. 1978, Grover 1983
<i>Didelphis virginiana</i> (opossum)	carrion	TX	Taylor and Hellgren 1997
<i>Sorex</i> sp. (shrew)	entire organism	NC, TN	Ackerman et al. 1978
<i>Sorex trowbridgii</i> (Trowbridge's shrew)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Scapanus latimanus</i> (broad-footed mole)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Dasyus novemcinctus</i> (nine-banded armadillo)	entire organism	TX	Kroll 1986
<i>Sylvilagus bachmani</i> (brush rabbit)	carrion	CA	Wilcox and Van Vuren 2009
<i>Sylvilagus floridanus</i> (eastern cottontail)	carrion	TX	Taylor and Hellgren 1997
Rodentia (rodent - general)	entire organism, carrion	GA, SC, TX	Hanson and Karstad 1959, Springer 1975, DeVault and Rhodes 2002
<i>Citellus beecheyi</i> (ground squirrel)	carrion	CA	Pine and Gerdes 1973
<i>Microtus californicus</i> (California vole)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Microtus</i> sp. (voles)	entire organism	CA	Loggins et al. 2002
<i>Ondatra zibethicus</i> (muskrat)	entire organism	MS	Hanson and Karstad 1959
<i>Neotoma fuscipes</i> (dusky-footed woodrat)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Peromyscus</i> sp. (deer mice)	entire organism	NC, SC, TN, TX	Ackerman et al. 1978, Wood and Roark 1980, Taylor and Hellgren 1997
<i>Peromyscus maniculatus</i> (deer mouse)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Peromyscus truei</i> (piñon mouse)	entire organism	CA	Wilcox and Van Vuren 2009
<i>Reithrodontomys megalotis</i> (western harvest mouse)	entire organism	CA	Wilcox and Van Vuren 2009

Table 2. Listing of plants, fungi and animals consumed by wild pigs in the continental United States (Continued).

Taxonomic Group or Scientific Name (Common name)	Part(s) Consumed	State(s) Reported From	Reference(s)
<i>Spermophilus beecheyi</i> (California ground squirrel)	entire organism	CA	Loggins et al. 2002, Wilcox and Van Vuren 2009
<i>Tamias striatus</i> (eastern chipmunk)	entire organism	TN	Stegeman 1938
<i>Thomomys bottae</i> (Botta's pocket gopher)	carrion	CA	Pine and Gerdes 1973, Wilcox and Van Vuren 2009
<i>Sus scrofa</i> (wild pig)	carrion	GA, TX	Hanson and Karstad 1959, Hellgren and Holzem 1992, Taylor and Hellgren 1997
<i>Axis axis</i> (chital or axis deer)	carrion	TX	J. J. Mayer, unpubl. data
<i>Bos taurus</i> (domestic cattle)	carrion, calves/entire organism	CA, FL, TX	Towne and Wentworth 1950, Springer 1975, Barrett 1978, J. J. Mayer, unpubl. data
<i>Capra hircus</i> (domestic goat)	carrion, kids/entire organism	TX	Mayer and Brisbin 1991, Beach 1993, Littauer 1993
<i>Odocoileus hemionus</i> (mule/black-tailed deer)	carrion	CA	Pine and Gerdes 1973, Grover 1983, Loggins et al. 2002, Wilcox and Van Vuren 2009
<i>Odocoileus virginianus</i> (white-tailed deer)	carrion, fawns/entire organism	SC, TX	Rutledge 1970, Springer 1975, Hellgren and Holzem 1992, Beach 1993, Taylor and Hellgren 1997, Jolley 2007, J. J. Mayer, unpubl. data
<i>Ovis aries</i> (domestic sheep)	carrion, lambs/entire organism	CA, SC, TX	Rutledge 1970, Barrett 1978, Beach 1993, Littauer 1993

Wild Pigs

Table 3. Comparison of the plant material composition found in wild pig diets. Data are grouped as: (1) fruits and seeds, (2) aboveground herbaceous material (leaves, stems, shoots, etc.), and (3) belowground herbaceous material (roots, tubers, bulbs, corms, etc.), each presented as percent volume (Vol) and percent frequency of occurrence (Occur) in the diet at each location.

Location	Fruits and Seeds		Aboveground Herbaceous		Belowground Herbaceous		Reference
	Vol	Occur	Vol	Occur	Vol	Occur	
Great Smoky Mountains National Park, NC and TN, USA	55.2-89.5 ^a	67-100 ^a	2.8-28.9 ^a	80-100 ^a	tr-13.2 ^a	50-80 ^a	Ackerman et al. 1978
Davis Mountains, TX, USA	3.9	NR	38.6	NR	34.3	NR	Adkins and Harveson 2006
Santa Catalina Island, CA, USA	32.0-57.2 ^a	94.7-100.0 ^a	29.1-60.2 ^{ab}	94.7-97.4 ^{ab}	2.2-8.5 ^a	28.9-65.8 ^a	Baber and Coblenz 1987
Maurienne Valley, Savoie Department, France	36 ^b	NR	17	98	39	97	Baubet et al. 2004
Area around Chernobyl powerplant, Polesie Region, Ukraine	0-47 ^{ab}	NR	9-81 ^{ab}	NR	1-41 ^{ab}	NR	Eriksson and Petrov 1995
Kipahulu Valley, Maui, HI, USA	28.4	57.1	58.9 ^b	71.4	3.1	32.1	Diong 1982
Natural Park of Aiguamolls de l' Emporda, Catalonia, Spain	44.2 ^b	NR	12.1 ^b	NR	33.0	57.8	Giménez-Anaya et al. 2008
Tellico Wildlife Management Area, TN, USA	83.6 ^b	NR	2.5 ^b	NR	3.3	57.5	Henry and Conley 1972
Natural Park of Aiguamolls de l' Emporda, Catalonia, Spain	51.9 ^b	NR	13.9	62.2	17.4	29.7	Herrero et al. 2004
Great Smoky Mountains National Park, NC and TN, USA	3.1	NR	55.3	NR	40.2	NR	Howe et al. 1981
Great Smoky Mountains National Park, NC and TN, USA	24.4 ^b	NR	30.0 ^b	NR	44.7	NR	Scott and Pelton 1975
South Texas Plains, TX, USA	34.4 ^b	NR	41.3 ^b	NR	17.3	73.5	Taylor and Hellgren 1997
Urewera Ranges, North Island, New Zealand	35.9 ^b	NR	11.6 ^b	NR	17.4 ^b	NR	Thomson and Challies 1988
Hobcaw Barony, SC, USA	9.2-83.7 ^a	54-94 ^a	9.5-51.4 ^a	100	2.2-38.0 ^a	44-95 ^a	Wood and Roark 1980

^a Annual, seasonal or location variation

^b Calculated from reference

Table 4. Comparison of the dietary composition of invertebrate and vertebrate prey in wild pigs. Data are presented as percent volume (Vol) and percent frequency of occurrence (Occur) in the diet at each location.

Location	Invertebrates		Vertebrates		Reference(s)
	Vol	Occur	Vol	Occur	
Doñana National Park, Spain	3	64	<1	27	Abáigar 1993
Great Smoky Mountains National Park, NC and TN, USA	Tr-8.2 ^a	100	Tr-2.6 ^a	20-60 ^a	Ackerman et al. 1978
Davis Mountains, TX, USA	1.3	NR	0.7	NR	Adkins and Harveson 2006
Santa Catalina Island, CA, USA	1.7-3.2 ^a	23.7-49.4 ^a	Trace	8.9	Baber and Coblenz 1987
Maurienne Valley, Savoie Department, France	1.0	75	0	-	Baubet et al. 2004
Horn Island, MS, USA	4.4 ^b	80 ^b	14.6 ^b	60 ^b	Baron 1979
Auckland Island, New Zealand	27.8	76	5.4	12	Chimera et al. 1995
Temperate Monte Desert Reserve of Ñacuñen, Mendoza, Argentina	4.0	NR	1.0	NR	Cuevas et al. 2007
Kipahulu Valley, Maui, HI, USA	6.8	89.2	0	-	Diong 1982
Varaita Valley, Cuneo Province, Italy	1.1	65	6.1	65	Durio et al. 1995
Yturria Ranch, Willacy County, TX, USA	0.5	NR	4.3	10	Everitt and Alaniz 1980
Herault Department, France	3	88	0	-	Fournier-Chambrillon et al. 1995
Natural Park of Aiguamolls de l'Emporda, Catalonia, Spain	3.4	75.4	3.3	24.6	Giménez-Anaya et al. 2008
Tellico Wildlife Management Area, TN, USA	5.4	86.3	1.0	30.1	Henry and Conley 1972
Natural Park of Aiguamolls de l'Emporda, Catalonia, Spain	3.2	28.0	4.9	32.4	Herrero et al. 2004
Great Smoky Mountains National Park, NC and TN, USA	1.1	NR	0.5	NR	Howe et al. 1981
Gipuzkoa and Bizbaia provinces, Spain	1.8	67.4	3.2	41.9	Irizar et al. 2004
National Park of Chrea, Algeria	1.0	NR	0	-	Klaa 1992
Great Smoky Mountains National Park, NC and TN, USA	0.2	52.3	Trace	23.4	Scott and Pelton 1975
Herault and Aude Departments, France	2.1	NR	1.6	NR	Sjarmidi et al. 1992
South-central Chile	7.4	NR	8.7	NR	Skewes et al. 2007

Wild Pigs

Table 4. Comparison of the dietary composition of invertebrate and vertebrate prey in wild pigs. Data are presented as percent volume (Vol) and percent frequency of occurrence (Occur) in the diet at each location. (Continued)

Location	Invertebrates		Vertebrates		Reference(s)
	Vol	Occur	Vol	Occur	
South Texas Plains, TX, USA	2.4	28	4.2	23	Taylor and Hellgren 1997
Urewera Ranges, North Island, New Zealand	13.2	79	12.4 ^b	45	Thomson and Challies 1988
Diablo Range, Santa Clara County, CA, USA	NR	NR	NR	40.4	Wilcox and Van Vuren 2009
Hobcaw Barony, SC, USA	0.6-2.8 ^a	85 ^a	0.7-2.8 ^a	24	Wood and Roark 1980

^a Annual, seasonal or location variation

^b Calculated from reference

Table 5. Chemical constituents of tropical and temperate fruits and other items likely to be eaten by wild pigs (Choquenot et al. 1996).

Food Item	Constituent (% dry matter)		
	Crude Protein	Sugars and Starch	Cellulose
<i>Tropical and Temperate</i>			
Fruits	3-12	12-78	1-8
Seeds	3-15	2-16	-
Grasses	4-17	3-19	15-40
Forbs	4-35	2-18	6-33
<i>Tropical Trees and Shrubs</i>			
Young leaves	7-55	0-33	6-25
Mature leaves	5-36	1-15	11-30
<i>General</i>			
Bulbs	12-15	-	-
Legumes	24-25	-	-
Earthworms	54-80	-	-
Insects	60	7	-
Carrion (cow)	57	-	-

Table 6. Daily nutrient requirements of domestic pigs for different weight classes (Barrett 1978).

Daily Nutrient Requirement	Growing Pigs			Breeding Sows	Lactating Sows	Boars
	5 – 10 kg	10 – 20 kg	20 – 35 kg	110 – 160 kg	136 – 200 kg	110 – 180 kg
<i>Digestible Energy</i>						
Kilocalories per kilogram forage	3,500	3,500	3,300	3,300	3,300	3,300
Kilocalories per day	2,100	4,370	5,610	6,600	16,500	8,250
<i>Total Feed</i>						
Air dry weight (in kg)	0.6	1.3	1.7	2.0	5.0	2.5
<i>Crude Protein</i>						
Percentage of diet	22	18	16	14	15	14
Grams per day	132	225	272	280	750	350

Wild Pigs

Literature Cited

- Abáigar, T. 1993. Regimen alimentario del jabali (*Sus scrofa*, L. 1758) en el sudeste iberico. Donana, Acta Vertebrata, 20(1):35-48.
- Ackerman, B. B., M. E. Harmon, and F. J. Singer. 1978. Part II. Seasonal food habits of European wild boar – 1977. Pp. 94-137. In F. J. Singer (ed.), Studies of European wild boar in the Great Smoky Mountains National Park: 1st annual report; a report for the Superintendent. Uplands Field Research Laboratory, Great Smoky Mountains National Park, Gatlinburg, Tennessee.
- Adkins, R. N., and L. A. Harveson. 2006. Summer diets of feral hogs in the Davis Mountains, Texas. The Southwestern Naturalist 51(4):578-580.
- Asahi, M. 1995. Stomach contents of Japanese wild boar in winter. Journal of Mountain Ecology (Ibex), 3:184-185.
- Baber, D. W., and B. E. Coblenz. 1987. Diet, nutrition and conception in feral pigs on Santa Catalina Island. Journal of Wildlife Management, 51(2):306-317.
- Baker, J. K. 1975. The feral pig in Hawaii Volcanoes National Park. Transactions of the California-Nevada Section of the Wildlife Society, 22:74-80.
- Baron, J. S. 1979. Vegetation damage by feral hogs on Horn Island, Gulf Islands National Seashore, Mississippi. M.S. Thesis, University of Wisconsin – Madison, Madison, Wisconsin.
- Barrett, R. H. 1978. The feral hog on the Dye Creek Ranch, California. Hilgardia, 46(9):283-355.
- Baubet, E., Y. Ropert-Coudert, and S. Brandt. 2003. Seasonal and annual variation in earthworm consumption by wild boar (*Sus scrofa scrofa* L.). Wildlife Research, 30(2):179-186.
- Baubet, E., C. Bonenfant, and S. Brandt. 2004. Diet of the wild boar in the French Alps. Galemys, 16(Special Edition):99-111.
- Beach, R. 1993. Depredation problems involving feral hogs. Pp. 67-75. In C. W. Hanselka and J. F. Cadenhead (eds.), Feral swine: A compendium for resource managers. Texas Agricultural Extension Service, Kerrville, Texas.
- Beyer, W. N., E. E. Connor, and S. Gerould. 1994. Estimates of soil ingestion by wildlife. Journal of Wildlife Management, 58(2):375-382.
- Bodenchuk, M. J. 2008. Feral hog management: Tying performance measures to resources protected. 4 pp. In S. M. Vantassel (ed.), 2008 National conference on feral hogs. St. Louis, Missouri. <http://digitalcommons.unl.edu/feralhog/8>
- Briedermann, L. 1976. Ergebnisse einer Inhaltsanalyse von 665 Wildschweinemagen. Der Zoologische Garten, 46(3):157-185.
- _____. 1986. Schwarzwild. VEB Deutscher Landwirtschaftsverlag, Berlin, Democratic Republic of Germany.
- Brooks, J. E., E. Ahmad, and I. Hussain. 1988. Characteristics of damage by vertebrate pests to groundnuts in Pakistan. Proceedings of the Vertebrate Pest Conference, 13:129-133.
- Challies, C. N. 1975. Feral pigs (*Sus scrofa*) on Auckland Island: Status and effects on vegetation and nesting sea birds. New Zealand Journal of Zoology, 2(4):479-490.

- Chimera, C., M. C. Coleman, and J. P. Parkes. 1995. Diet of feral goats and feral pigs on Auckland Island, New Zealand. *New Zealand Journal of Ecology*, 19:203-207.
- Chipping, D. H. 1993. Impacts of wild pig on native vegetation. Pp. 4. *In* W. Tietje and R. Barrett (eds.), *The wild pig in California oak woodland: Ecology and economics*. University of California, Berkeley, Berkeley, California.
- Choquenot, D., J. McIlroy, and T. Korn. 1996. *Managing vertebrate pests: Feral pigs*. Bureau of Rural Sciences, Australian Government Publishing Service, Canberra, Australia.
- Coblentz, B. E., and D. W. Baber. 1987. Biology and control of feral pigs on Isla Santiago, Galapagos, Ecuador. *Journal of Applied Ecology*, 24(2):403-418.
- Conley, R. H., V. G. Henry, and G. H. Matschke. 1972. Final report for the European hog research project W-34. Tennessee Game and Fish Commission, Nashville, Tennessee.
- Cuevas, F. A. Novillo, M. Dacar, B. Bender, C. Campos, and R. A. Ojeda. 2007. Ecology of wild boar, *Sus scrofa*, in the Temperate Monte Desert Reserve (MAB) of Ñacuñen, Argentina. Grupo de Investigaciones de la Biodiversidad (GiB), IADIZA, CONICET, CRICYT, Mendoza, Argentina.
- Dardaillon, M. 1987. Seasonal feeding habits of the wild boar in a mediterranean wetland, the Camargue (southern France). *Acta Theriologica*, 32(23):389-401.
- _____. 1989. Age class influences on feeding choices of free-ranging wild boars (*Sus scrofa*). *Canadian Journal of Zoology*, 67(11):2792-2796.
- de Nevers, G. 1993. What is feral hog damage? Pp. 9-10. *In* W. Tietje and R. Barrett (eds.), *The wild pig in California oak woodland: Ecology and economics*, University of California, Berkeley, Berkeley, California.
- DeVault, T. L., and O. E. Rhodes, Jr. 2002. Identification of vertebrate scavengers of small mammal carcasses in a forested landscape. *Acta Theriologica*, 47:185-192.
- Devine, R. S. 1999. *Alien invasion: America's battle with non-native animals and plants*. National Geographic Society, Washington, DC.
- Diaz, A. 2008. *Managing the feral hog menace on Matagorda Island National Wildlife Refuge*. Fish & Wildlife Journal. U. S. Fish and Wildlife Service, Department of the Interior, Washington, D.C.
- Diong, C. H. 1973. Studies of the Malaysian wild pig in Perak and Jahore. *Malayan Nature Journal*, 26(3/4):120-151.
- _____. 1982. Population biology and management of the feral pig (*Sus scrofa* L.) in Kipahula Valley, Maui. Ph.D. Dissertation, University of Hawaii, Honolulu, Hawaii.
- Durio, P., D. Fogliato, A. Perrone, and N. Tessarin. 1995. The autumn diet of the wild boar (*Sus scrofa*) in an alpine valley. Preliminary results. *Journal of Mountain Ecology (Ibex)*, 3:180-183.
- Eriksson, O., and M. Petrov. 1995. Wild boars (*Sus scrofa scrofa* L.) around Chernobyl, Ukraine. Seasonal feed choice in an environment under transition – A baseline study. *Journal of Mountain Ecology (Ibex)*, 3:171-173.
- Erkinaro, E., K. Heikura, E. Lindgren, E. Pulliainen, and S. Sulkava. 1982. Occurrence and spread of the wild boar (*Sus scrofa*) in eastern Fennoscandia (in English with Finnish summary). *Memoranda Societas Fauna et Flora Fennica*, 58(2):39-47.

Wild Pigs

- Everitt, J. H., and M. A. Alaniz. 1980. Fall and winter diets of feral pigs in south Texas. *Journal of Range Management*, 33(2):126-129.
- Focardi, S., D. Capizzi, and D. Monetti. 2000. Competition for acorns among wild boar (*Sus scrofa*) and small mammals in a Mediterranean woodland. *Journal of Zoology* 250(3):329-334.
- Fournier-Chambrillon, C., D. Maillard, and P. Fournier. 1995. Diet of the wild boar (*Sus scrofa* L.) inhabiting the Montpellier garrigue. *Journal of Mountain Ecology (Ibex)*, 3:174-179.
- Fries, G. F., G. S. Marrow and P. A. Snow. 1982. Soil ingestion by swine as a route of contaminant exposure. *Environmental Chemistry*, 1:201-204.
- Geisser, H., and H. U. Reyer. 2005. The influence of food and temperature on population density of wild boar *Sus scrofa* in the Thurgau (Switzerland). *Journal of Zoology*, 267(1):89-96.
- Genard, M., F. Lescourret, and G. Durrieu. 1988. Mycophagie chez le sanglier et hypotheses sur son role dans la dissemination des spores de champignons hypoges. *Canadian Journal of Zoology*, 66(10):2324-2327.
- Genov, P. 1981a. Food composition of wild boar in North-eastern and Western Poland. *Acta Theriologica*, 26(10):185-205.
- _____. 1981b. Significance of natural biocenoses and agrocenoses as the source of food for wild boar (*Sus scrofa* L.). *Ekologia Polska*, 29(1):117-136.
- Giffin, J. G. 1970. Feral game mammal survey: Feral pig survey (Hawaii), Project No. W-5-R-21, Job No. 46 (21). State of Hawaii, Division of Fish and Game, Honolulu, Hawaii.
- Giménez-Anaya, A., J. Herrero, C. Rosell, S. Couto, and A. García-Serrano. 2008. Food habits of wild boars (*Sus scrofa*) in a Mediterranean coastal wetland. *Wetlands*, 28(1):197-203.
- Groot Bruinderink, G. W. T. A., and E. Hazebroek. 1995. Modelling carrying capacity for wild boar *Sus scrofa scrofa* in a forest/heathland ecosystem. *Wildlife Biology*, 1(2):81-87.
- _____. 1996. Wild boar (*Sus scrofa*) rooting and forest regeneration on podzolic soils in the Netherlands. *Forest Ecology and Management*, 88(1-2):71-80.
- Groot Bruinderink, G. W. T. A., E. Hazebroek, and H. van der Voot. 1994. Diet and condition of wild boar, *Sus scrofa scrofa*, without supplementary feeding. *Journal of Zoology*, 233(4):631-648.
- Grover, A. M. 1983. The home range, habitat utilization, group behavior and food habits of the feral hog (*Sus scrofa*) in northern California. M.S. Thesis, California State University, Sacramento, California.
- Haber, A. 1966. Pozywienie dzika. *Lowiec Polski*, 14(1281):2-3.
- Hahn, N., D. Eisfeld, P. Havet, E. Taran, and J. C. Berthos. 1998. Diet and habitat use of wild boar (*Sus scrofa*) in SW-Germany. *Gibier et Fauna Sauvage*, 15(2):595-606.
- Hanson, R. P., and L. Karstad. 1959. Feral swine in the southeastern United States. *Journal of Wildlife Management*, 23(1):64-74.
- Hayes, R. B., N. B. Marsh, and G. A. Bishop. 1996. Sea turtle nest depredation by a feral hog: A learned behavior. Pp. 129-134. *In* J. A. Keinath, D. E. Barnard, J. A. Musick, and B. A. Bell (eds.), *Proceedings of the fifteenth annual symposium on sea turtle biology and conservation*. NOAA Technical Memorandum MNFS-SEFSC 387, Hilton Head Island, South Carolina.

- Hellgren, E. C., and A. M. Holzem. 1992. Feral hog food habits in the western Rio Grande Plains. Texas Parks and Wildl. Dept., Austin, Texas.
- Hennig, R. 1981. Schwarzwild: Biologie – Verhalten, Hege und Jagd. BVL Verlagsgesellschaft, Munchen, West Germany.
- Henry, V. G. 1969. Predation on dummy nests of ground-nesting birds in the southern Appalachians. *Journal of Wildlife Management* 33(1):169-172.
- Henry, V. G., and R. H. Conley. 1972. Fall foods of the European wild hogs in the southern Appalachians. *Journal of Wildlife Management*, 36(3):854-860.
- Herrero, J., S. Couto, C. Rosell, and P. Arias. 2004. Preliminary data on the diet of wild boar living in a Mediterranean coastal wetland. *Galemys*, 16(Número Especial):115-123.
- Howe, T. D., F. J. Singer, and B. B. Ackerman. 1981. Forage relationships of European wild boar invading northern hardwood forests. *Journal of Wildlife Management*, 45(3):748-754.
- Ilse, L. M., and E. C. Hellgren. 1995. Resource partitioning by sympatric populations of collared peccaries and feral hogs in southern Texas. *Journal of Mammalogy*, 76(3):784-799.
- Irizar, I., N. A. Laskurain, and J. Herrero. 2004. Wild boar frugivory in the Atlantic Basque Country. *Galemys*, 16(Número Especial):125-133.
- Janda, M. 1958. Die Nahrung des Schwarzwildes (*Sus scrofa*) im Mittelgebirgsgebiet von Stiavnica. *Saugetierkundliche Mitteilungen*, 6(2):67-74.
- Jolley, D. B. 2007. Reproduction and herpetofauna depredation of feral pigs at Fort Benning, Georgia. M.S. Thesis, Auburn University, Auburn, Alabama.
- Jolley, D. B., S. S. Ditchkoff, W. D. Sparklin, L. B. Hanson, M. S. Mitchell, and J. B. Grand. In Press. An estimate of herpetofauna depredation by a population of wild pigs. *Journal of Mammalogy*.
- Klaa, K. 1992. The diet of wild boar (*Sus scrofa* L.) in the National Park of Chrea (Algeria). Pp. 403-407. *In* F. Spitz, G. Janeau, G. Gonzalez, and S. Aulagnier (eds.), *Ongules/Ungulates 91: Proceedings of the international symposium*. Toulouse, France, September 2-6, 1991. Societe Francaise pour l'Etude et la Protection des Mammiferes, and Toulouse: Institut de Recherche sur les Grands Mammiferes, Paris & Toulouse, France.
- Kozlo, P. G. 1975. *Dikiy Kaban*. Izdatel'stovo Uradzhai, Minsk, U.S.S.R.
- Kroll, J. C. 1986. Interspecific competition between feral hogs and white-tailed deer in the post oak savannah region of Texas. F. A. Proj. W-109-R-8 Job. No. 44, Final Perf. Report. Texas Parks and Wildlife Department, Austin, Texas.
- Kurz, J. C. 1971. A study of feral hog movements and ecology on the Savannah River Plant, South Carolina. M.S. Thesis, University of Georgia, Athens, Georgia.
- Lebedeva, L. S. 1956. O sostave letnich kormov kabana v vysokogornoj zonie Kavkaskogo zapovednika. *Uchenye Zapiski Moskovskaya Gosudarstvennyi Pedagogicheskii Instituta Zoologii*, 61(1):4-6.
- Lemel, J. 1999. Populationstillvaxt, dynamik och spridning hos Vildsvinet, *Sus scrofa*, i mellersta Sverige. Slutrapport till Naturvardsverket/Jagareforbundet, Stockholm, Sweden.
- Lipscomb, D. J. 1989. Impacts of feral hogs on longleaf pine regeneration. *Southern Journal of Applied Forestry* 13(4):177-181.

Wild Pigs

- Littauer, G. A. 1993. Control techniques for feral hogs. Pp. 139-148. *In* C. W. Hanselka and J. F. Cadenhead (eds.), *Feral swine: A compendium for resource managers*. Texas Agricultural Extension Service, Kerrville, Texas.
- Loggins, R. E., J. T. Wilcox, D. H. V. Vuren, and R. A. Sweitzer. 2002. Seasonal diet of wild pigs in oak woodlands of the central coast region of California. *California Fish and Game* 88(1):28-34.
- Mapston, M. E. 2004. Feral hogs in Texas. Document No. B-6149 5-04. Wildlife Services, Texas Cooperative Extension, Texas A&M University, College Station, Texas.
- Massei, G., P. V. Genov, and B. W. Staines. 1996. Diet, food availability and reproduction of wild boar in a mediterranean coastal area. *Acta Theriologica*, 41(3):307-320.
- Matschke, G. H. 1964. The influence of oak mast on European wild hog reproduction. *Proceedings of the Annual Conference of the Southeastern Association of Game and Fish Commissioners*, 18:35-39.
- Mayer, J. J., and I. L. Brisbin, Jr. 1991. Wild pigs in the United States: Their history, comparative morphology, and current status. The University of Georgia Press, Athens, Georgia.
- _____. 1995. Feral swine and their role in the conservation of global livestock genetic diversity. Pp. 175-179. *In* R. D. Crawford, E. E. Lister, and J. T. Buckley (eds.), *Proceedings of the third global conference on conservation of domestic animal genetic resources*. Rare Breeds International, Warwickshire, England, U.K.
- Mayer, J. J., E. A. Nelson, and L. D. Wike. 2000. Selective depredation of planted hardwood seedlings by wild pigs in a wetland restoration area. *Ecological Engineering*, 15(Supplement 1):S79-S85.
- Mazzotti, F. J. and L. A. Brandt. 1994. Ecology of the American alligator in a seasonally fluctuating environment. Pp. 485-506. *In* S. M. Davis and J. C. Ogden (eds.), *Everglades: The ecosystem and its restoration*. CRC Press, Boca Raton, Florida.
- McIlhenny, E. A. 1976. The alligator's life history. Society for the Study of Amphibians and Reptiles. Lawrence, Kansas.
- National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States. FWS/OBS-80/01. Biological Services Program, U. S. Fish and Wildlife Service, Department of the Interior, Washington, D.C.
- NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1991. Recovery plan for U.S. population of Atlantic green turtle. National Marine Fisheries Service, Washington, D.C.
- Neill, W. T. 1971. The last of the ruling reptiles: Alligators, crocodiles, and their kin. Columbia University Press, New York.
- Oliver, W. L. R., and I. L. Brisbin, Jr. 1993. Introduced and feral pigs: Problems, policy, and priorities. Pp. 179-191. *In* W. L. R. Oliver (ed.), *Pigs, peccaries and hippos: Status survey and conservation action plan*. International Union for the Conservation of Nature and Natural Resources, Gland, Switzerland.
- Pavlov, P. M. 1980. The diet and general ecology of the feral pig (*Sus scrofa*) at Girilambone, N. S. W. M.S. Thesis, Monash University, Melbourne, Australia.
- Pavlov, P. M., and J. Hone. 1982. The behavior of feral pigs, *Sus scrofa*, in flocks of lambing ewes. *Australian Wildlife Research*, 9(1):101-109.

- Peart, D. 1993. Impact of feral pig activity on vegetation composition associated with *Quercus agrifolia* on Santa Cruz Island, California. Pp. 12-13. In W. Tietje and R. Barrett (eds.), *The wild pig in California oak woodland: Ecology and economics*. University of California, Berkeley, Berkeley, California.
- Pine, D. S., and G. L. Gerdes. 1973. Wild pigs in Monterey County, California. *California Fish and Game*, 59(2):126-137.
- Pinna, W., G. Nieddu, G. Moniello, and M.G. Cappai. 2007. Vegetable and animal food sorts found in the gastric content of Sardinian Wild Boar (*Sus scrofa meridionalis*). *Journal of Animal Physiology & Animal Nutrition*, 91(5-6): 252-255.
- Rockenbach, S. I. 2005. "War upon our border": War and society in two Ohio valley communities, 1861-1865. Ph.D. Dissertation, University of Cincinnati, Cincinnati, Ohio.
- Rudge, M. R. 1976. A note on the food of feral pigs (*Sus scrofa*) of Auckland Island. *Proceedings of the New Zealand Ecological Society*, 23:83-84.
- Rutledge, A. 1970. *The woods and wild things I remember*. R. L. Bryan Company, Columbia, South Carolina.
- Sablina, T. B. 1955. Kopytnye Belovezhskoi Pushchi (Ungulates of the Bialowieza Preserve). *Akademeiia Nauk SRR. Institut Morfologii Zhivotnykh*, 15:1-191.
- Schley, L., and T. J. Roper. 2003. Diet of wild boar *Sus scrofa* in Western Europe, with particular reference to consumption of agricultural crops. *Mammal Review*, 33(1):43-56.
- Schneider, E. 1975. Mause in Magen eines Wildschweines (*Sus scrofa* L.). *Zeitschrift fur Jagdwissenschaft*, 21(3):190-192.
- Scott, C. D., and M. R. Pelton. 1975. Seasonal food habits of the European wild hog in the Great Smoky Mountains National Park. *Proceedings of the Annual Conference of the Southeastern Association of Fish & Wildlife Agencies*, 29:585-593.
- Sjarmidi, A., F. Spitz, and G. Valet. 1992. Food resource use by wild boar in southern France. Pp. 171-173. In F. Spitz, G. Janeau, G. Gonzalez, and S. Aulagnier (eds.), *Ongules/Ungulates 91: Proceedings of the international symposium*. Toulouse, France, September 2-6, 1991. Societe Francaise pour l'Etude et la Protection des Mammiferes, and Toulouse: Institut de Recherche sur les Grands Mammiferes, Paris & Toulouse, France.
- Skewes, O., R. Rodriguez, and F. M. Jaksic. 2007. Ecologia trofica del jabali europeo (*Sus scrofa*) silvestre en Chile. *Revista Chilena de Historia Natural* 80: 295-307.
- Springer, M. D. 1975. Food habits of wild hogs on the Texas Gulf Coast. M.S. Thesis, Texas A&M University, College Station, Texas.
- Stegeman, L. J. 1938. The European wild boar in the Cherokee National Forest, Tennessee. *Journal of Mammalogy*, 19(3):279-290.
- Stevens, R. L. 1996. *The feral hog in Oklahoma*. Samuel Roberts Noble Foundation, Ardmore, Oklahoma.
- Sweeney, J. R., J. M. Sweeney, and S. W. Sweeney. 2003. Feral hog, *Sus scrofa*. Pp. 1164-1179. In G. A. Feldhammer, B. C. Thompson, and J. A. Chapman (eds.), *Wild mammals of North America: Biology, management, and conservation*. The Johns Hopkins Univ. Press, Baltimore, Maryland.
- Taylor, R. B., and E. C. Hellgren. 1997. Diet of feral hogs in western South Texas plains. *The Southwest Naturalist*, 42(1):33-39.

Wild Pigs

- Thompson, R. L. 1977. Feral hogs on national wildlife refuges. Pp. 11-15. *In* G. W. Wood (ed.), Research and management of wild hog populations. Belle Baruch Forest Science Institute of Clemson University, Georgetown, South Carolina.
- Thomson, C., and C. N. Challies. 1988. Diet of feral pigs in the podocarp-tawa forests of the Urewera Ranges. *New Zealand Journal of Ecology*, 11:73-78.
- Tisdell, C. A. 1982. Wild pigs: Environmental pest or economic resource? Pergamon Press, New York.
- Tolleson, D., D. Rollins, W. Pinchak, M. Ivy, and A. Hierman. 1993. Impact of feral hogs on ground-nesting gamebirds. Pp. 76-83. *In* C. W. Hanselka and J. F. Cadenhead (eds.), Feral swine: A compendium for resource managers. Texas Agricultural Extension Service, Kerrville, Texas.
- Towne, C. W., and E. N. Wentworth. 1950. Pigs from cave to cornbelt. University of Oklahoma Press, Norman, Oklahoma.
- Tucak, Z. 1996. Mageninhaltsuntersuchungen von Schwarzwild (*Sus scrofa* L.) im ungegatterten Teil des Waldjagdrevieres Belje in Baranja. *Zeitschrift für Jagdwissenschaft*, 42(3):165-172.
- Wakeley, P. C. 1954. Planting the southern pines. Forest Service, U.S. Department of Agriculture, Washington, D.C.
- Wathen, G., J. Thomas, and J. Farmer. 1988. European wild hog bait enhancement study - Final report. Research/Resource Management Report Series, U. S. Department of the Interior, National Park Service, Southeast Region, Atlanta, Georgia.
- Whicker, F. W. 1991. Observations on the Par Pond drawdown: A summary to-date. Savannah River Ecology Laboratory, Aiken, SC.
- Wilcox, J. T., and D. H. Van Vuren. 2009. Wild pigs as predators in oak woodlands of California. *Journal of Mammalogy*, 90(1):114-118.
- Williams, D. J., A. J. Ansford, D. S. Priday, and A. S. Forrest. 1998. Forensic Pathology: Colour Guide. Elsevier Health Services, Elsevier Press, New York.
- Wlazelko, M., and L. Labudzki. 1992. Über die Nahrungskomponenten und die trophische Stellung des Schwarzwildes im Forschungsgebiet Zielonka. *Zeitschrift für Jagdwissenschaft*, 38:81-87.
- Wood, G. W., and R. H. Barrett. 1979. Status of wild pigs in the United States. *Wildlife Society Bulletin*, 7(4):237-246.
- Wood, G. W., and D. N. Roark. 1980. Food habits of feral hogs in coastal South Carolina. *Journal of Wildlife Management*, 44(2):506-511.
- Zengel, S. A., and W. H. Conner. 2008. Could wild pigs impact water quality and aquatic biota in floodplain wetland and stream habitats at Congaree National Park, South Carolina? 5 pp. *In* Proceedings of the 2008 South Carolina Water Resources Conference, Charleston, South Carolina.