

INFLUENCE OF DIFFERENT BREEDS OF PIGS TO THE NATURAL SUCCESSION

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ABSTRACT

The aim of this study was to find out the effect of pigs on the natural succession. We used 4 different breeds of pigs for our investigations. Because of the grazing behaviour and their rooting activity the total number of plants increased up to 30%. But the vegetation quickly returned to conditions prior to rooting, if the rooting activity fails to happen. Rooting activity of pigs on floodplain soil and following grazing in the next spring after rooting permits seeds of different species of plants to germinate and develop in the plant free areas. These plants often have little chance to develop in closed grasslands. Especially small and light-loving plants get a chance to develop. Particularly the change of increasing rooting activity in autumn and intensive grazing in spring is realized by Duroc breed.

KEYWORDS

Pigs, grazing, rooting, vegetation, sociological association, natural succession

INTRODUCTION

Floodplain soil is normally very rich in nutrients. Therefore grassland is covered with a heavy and closed cover of grass. Light-loving plants have little chance to develop. Only the change of use of this grassland has no effect of increasing species of plants. The aim of sustainable land use is to preserve the existing species and also to multiply them.

To give a chance for the seeds which are in soil and come with the wind and with animals to grow, the closed cover of grass must be destroyed. Pigs affect the natural succession of grassland because of their grazing behaviour and their rooting activity.

MATERIAL AND METHODS

We used 4 different breeds of pigs for the investigation: 20 German Saddle Back, 12 Duroc, 8 Mangalica and 15 Schwerfurter Meat breed. The pigs were kept outdoors on grassland in the national park "Brandenburgische Elbtalau" from June until November. They were fed daily with 1 kg food containing 13 MJ metabolic energy and 17% crude protein with an ad libitum intake of grass and water. The pigs were managed extensively on an area of one ha for 5 pigs.

We made a first inclusion of plants in 1993, before pigs were turned out on pasture. We controlled the marked quarters every year. The determination of plants followed Klapp (1990) and Rothmaler (1990). We estimated the quantity of cover of the different plants using Braun-Blanquets (1964) methods. We determined the rooting activity of pigs with "transect-method" (Hone, 1980, Mühlenberg, 1993). A total of nearly 150 qm were examined along two transects in the area of every breed of pig. The observation of behaviour of pigs was carried out in intervals of 10 minutes (Stolba and Wood-Gush, 1989) every month.

RESULTS AND DISCUSSION

We found out that the rooting activity increased in the autumn (figure 1), especially after September and the pigs are rooting the acreages till 30%. The same observations, with increasing rooting activities in autumn, were observed by Bratton (1974), Jezierski and Myrcha (1975), Hone and Stone (1989) and Schmidt-Vielgut (1991). The quality of grass is decreasing (Kirchgeßner, 1992) and also the soil moisture is increasing in autumn. Those are the main points why rooting activity increased after September. The pigs are looking for roots, bulbs, insects, beetles, earthworms and mice (Ludwig, 1956; Janda, 1958; Ludewig, 1961; Kolb, 1967; Pine and Gerdes, 1973; Jezierski and Myrcha, 1975; Howe and Bratton, 1976; Heck and Raschke, 1980; Hennig, 1981; Bogner and Grauvogl, 1984; Briedermann, 1986; Meynhardt, 1986; Wiwianka, 1992). Schneider and Walter (1996) found increasing rooting activity of pigs with increasing soil moisture of pasture. Grazing shifts to rooting with increasing soil moisture.

The pigs are rooting to a depth of 5 to 7 cm (tab.2). Feral pigs in the Great Smoky National Park rooted the soil to a depth of 2 to 6 cm, sometimes 15 cm deep. Also Briedermann (1986) described rooting in the observed depth as the main kind of rooting in summer.

Increased grazing activity in spring (tab.1) and the rooting activity in the previous autumn keeps the vegetation short and permits the light to penetrate. The strong increase of rooting activity takes place only to the autumn, in that way new plants have enough time to develop. Through increasing rooting activity plants get areals to develop without pressure of grass in the next spring. This necessary rhythm of grazing in spring and early summer and increasing rooting activity in the autumn will be best realized by the Duroc breed. The grazing and rooting activity of pigs influenced the development of plants. The rooted parts of pasture shall be used by small and light-loving plants to germinate and develop the following spring.

We found out that the species of plants after grazing and rooting activity of pigs increased from 1993 with 70 species to 1994 with 91 species (figure 2). Similar observations with positive correlations between rooting activity of pigs and species richness in Forty Mile Scrub National Park (Australia) were observed by Fensham et al. (1994). Bratton (1974) found decreasing vernal flora of hardwood forests in the Great Smoky Mountains National Park because of wild boars. Pig rooting reduced the cover of species, because they were eaten, uprooted or trampled by pigs (Bratton, 1974).

In the following year after the natural succession, the vegetation reached nearly the constitution and quantity of plants before rooting (tab.2). The vegetation quickly reached the condition before rooting, if the rooting activity fails to happen. It means that the favoured light-loving plants which are able to develop after the rooting activity of the pigs disappeared immediately after beginning of natural succession.

REFERENCES

- Bogner, H., Grauvogl, A.** (1984) Verhalten landwirtschaftlicher Nutztiere, Verlag Eugen Ulmer, Stuttgart.
- Braun-Blanquet, J.** (1964) Pflanzensozioologie, Springer-Verlag, Stuttgart, 3. Auflage.
- Bratton, Susan, P.** (1974) The effect of the European wild boar (*Sus scrofa*) on the high-elevation vernal flora in Great Smoky Mountains National Park, Bulletin of the Torrey Botanical Club 101, 198-206.
- Briedermann, L.** (1986) Schwarzwild, Deutscher Landwirtschaftsverlag, Berlin, 2. Auflage.
- Ellenberg, H., Weber, H.E., Düll, R., Wirth, V., Werner, W., Pauliflen, D.** (1992) Zeigerwerte von Pflanzen in Mitteleuropa, Erich Gold KG, Göttingen, 2. Auflage, Scripta Geobotanica.
- Fensham, R.J., Fairfax, R.J., Cannell, R.J.** (1994) The invasion of *Lantana camara* L. in Forty Mile Scrub National Park, north Queensland, Australian Journal of Ecology 19, 297-305.
- Heck, L., Raschke, G.** (1980) Die Wildsau, Naturgeschichte-Ökologie-Hege und Jagd, Verlag Paul Parey, Hamburg, Berlin.
- Hennig, R.** (1981) Schwarzwild, Biologie-Verhalten-Hege und Jagd, BLV Verlagsgesellschaft München Wien Zürich.
- Hone, J.** (1980) Effect of feral pig rooting on introduced and native pasture in north-eastern New South Wales, Journal of the Australian Institute of Agricultural Science 46, 130-132.
- Hone, J. Stone, C.** (1989) A comparison and evaluation of feral pig management in two National Parks, Wildlife Society Bulletin 17, 419-425.
- Howe, T.D., Bratton, Susan, P.** (1976) Winter rooting activity of the European wild boar in the Great Smoky Mountains National Park, Castanea 41, 256-264.
- Janda, M.** (1958) Die Nahrung des Schwarzwildes, *Sus scrofa* L., im Mittelgebirgsgebiet von Stiavnica, Säugetierkundliche Mitteilungen 6, 67-74.
- Jezierski, W., Myrcha, A.** (1975) Food requirements of a wild boar population, Polish Ecological Studies 1, 61-83.

Kirchgesner, M. (1992) Tierernährung, DLG-Verlag: Frankfurt (Main), 8. Auflage.
Klapp, E. (1990) Taschenbuch der Gräser, Verlag Paul Parey, Berlin, Hamburg.
Ludewig, K.W. (1961) Schwarzwild im Forstschutz, Wild und Hund **6**, 166-167.
Ludwig, A. (1956) Haltung und Fütterung von Schweinen auf Dauerweiden, Diss. agr., Stuttgart, Hohenheim.
Meynhardt, H. (1986) Schwarzwildreport, Mein Leben unter Wildschweinen, Neumann Verlag, Leipzig, Radebeul.
Mühlenberg, M. (1993) Freilandökologie, Quelle und Meyer, UTB-Taschbücher, 3. Auflage.
Pine, D.S., Gerdes, G.L. (1973) Wild Pigs in Monterey County, California, California Fish and Game **59**, 126-137.

Rothmaler, W., Schubert, R., Vent, W. (1990) Exkursionsflora in Deutschland, Kritischer Band, Verlag Volk und Wissen, Berlin, 8. Auflage.
Schmid-Vielgut, Brigitte, Dopf, M., Bogenschütz, H. (1991) Einfluß von gegattertem Schwarzwild auf die Populationsdichte des Waldmaikäfers, Allgemeine Forstzeitschrift für Waldwirtschaft und Umweltvorsorge **14**, 719-721.
Schneider, P., Walter, J. (1996) Ethologische Untersuchungen von Mastschweinen auf Weiden Archiv für Tierzucht **39**, 299-307.
Stolba, A., Wood-Gush, D.G.M. (1989) The behaviour of pigs in a semi-natural environment, Animal Production **48**, 419-425.
Wiwianka, Birgit (1992) Mischbeweidung von Rind und Schwein, In: AID (1994) Landschaftspflege mit Nutztieren, 63-65.

Table 1

Grazing and rooting activity of different breeds of pigs in the course of vegetation period

Breed/month	sign	July	August	September	October	November
German grazing		37,4% a	33,9% a	33,5% a	26,4% a	5,1% b
Saddle Back rooting		0,8% b	12,2% a	11,7% a	1,5% b	10,1% a
Duroc grazing		51,3% a	50,6% a	46,7% a	24,9% b	14,8% b
rooting		0,7% b	1,0% b	2,5% b	6,1% b	22,5% a
Mangalica grazing		25,8% a	22,4% a	21,9% a	17,3% ab	13,0% b
rooting		0,5% b	2,5% b	4,1% a	4,9% a	5,3% b
Schwerfurter grazing		33,2% b	35,0% ab	48,5% a	33,8% ab	24,0% b
rooting		0,6% b	1,6% b	0,8% b	11,5% a	14,9% a

different letters within rows indicate significant differences (P (0,05)

Table 2

Sociological association of vegetation in 1993, 1994 and 1995 followed after Ellenberg et al. (1992)

starting point	number of plants		sociological association
	after rooting activity	after naturally succession	
	1993	1994	1995
7	11	12	vegetation of fresh water and moor
22	36	18	vegetation often disturbed places
26	26	23	anthropo-zoogene heath and grass
-	1	1	vegetation near the wood
1	2	2	foliage woods and related plants
11	11	7	come forward in different classes
3	4	1	without classification
70	91	63	total number of plants

Figure 1

Development of rooting activity of pigs from June until November

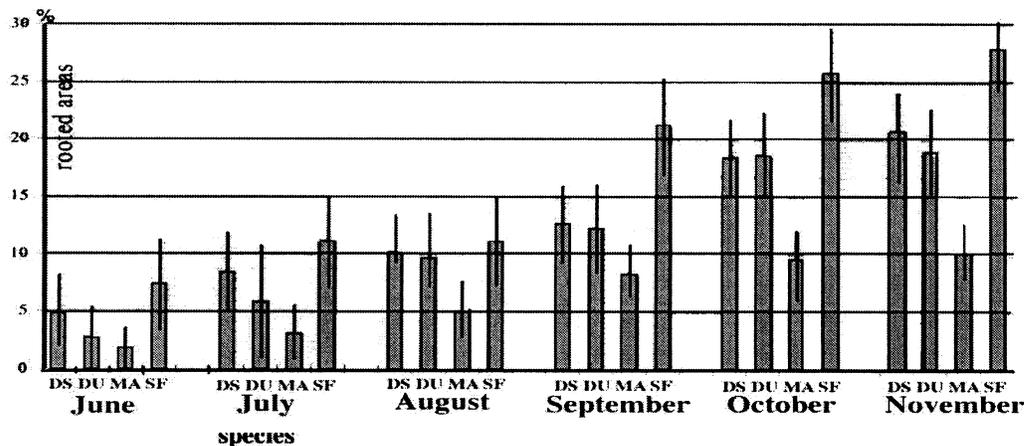


Figure 2

Development of vegetation after rooting activity of pigs and following natural succession.

