

EKO-2

R-EKO-2(1996)1

The use of natural products for consumption in Denmark

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Data sheet

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Publisher: Ministry of Environment and Energy
National Environmental Research Institute, Denmark©

Month and year of publication: May, 1996

Abstract: Through a questionnaire it was indicated that Danes use products from 'natural' ecosystems in an amount of approximately 2 kg per year. The most used products are berries and meat from game animals, whereas freshwater fish and wild mushrooms are less common in Danish kitchens.

Please quote: Strandberg, Morten Tune (1996): The use of natural products for consumption in Denmark. National Environmental Research Institute, Denmark. 26 pp.

Terms: Wildlife, freshwater fish, mushrooms, berries, questionnaire, consumption.

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Foreword

The idea behind this report was originally to produce data material concerning the use of wild mushrooms for consumption in Denmark. The reason was that wild mushrooms was thought to be important for the transfer of radioactive cesium from nature to man. This purpose was extended to include other products of natural or seminatural origin. This way the data material obtained could be used for an assessment of the total dose transferred from natural and seminatural ecosystems to man. At the same time knowledge within this field of use of nature is valuable in the administration of nature under the different institutions under the Ministry of the Environment.

The present investigation is small because of the limited amount of financing available for the project, therefore the investigation should not be taken as the true answer to the question 'How large an amount of edible products from nature is consumed by the average Dane?'. Rather it should be understood as a first guess or a pilot study, giving experience for further study within this field.

The project was co-financed by the NKS-EKO2 programme under the Nordic Council of Ministers and National Environmental Research Institute, Department of Terrestrial Ecology.

Acknowledgements

Hans Løkke from the National Environmental Research Institute, Department of Terrestrial Ecology and Sven. P. Nielsen from the Ecology Section under the Environmental Department at the Risø National Laboratory commented on the manuscript. Carsten Riis Olesen from the National Environmental Research Institute, Department of Landscape Ecology was consulted on the question of the weight of the different game animals.

Danish summary

Spiselige produkter (vildt, ferskvandsfisk, svampe og bær) fra seminaturlige og naturlige økosystemer, bortset fra de marine, spises som gennemsnit over et år i en mængde af ca. 2 kg pr. dansker. Den vigtigste faktor for den mængde der indtages synes at være, hvor man bor - mængden af omgivende natur er vigtig. Yderligere er der betydelige forskelle på hvad, og hvor meget forskellige erhvervsgrupper spiser af denne type produkter. I mængde er bær og vildt det, der spises mest, mens svampe og ferskvandsfisk spises mindre. Tredive procent af svarene angav intet forbrug af de omtalte produkter. Resten havde et forbrug enten ved egen indsamling eller ved at købe produkterne hos vildthandleren eller tilsvarende steder, hvor sådanne produkter handles.

1 Introduction

Mesolithic period

Until the end of the mesolithic period 6000 years ago everybody used the nature for collection of their food, the population lived as hunters and gatherers. As agricultural skill improved during the milleniums the collecting of food products from nature became less important. Nowadays it is of minor importance as a source of food, but for many people the act of providing food from nature is an important recreative value in their life and it surely gives zest to life for many modern hunters and gatherers.

Game animals

Today the extend of the use of products from natural and seminatural ecosystems for consumption is almost unknown in Denmark, except for the use of game animals. The statistics on yield of game animals from hunting carried out by the National Environmental Research Institute provide an estimate for this part of the consumption (The National Forest and Nature Agency 1996). Estimates of the use of other products such as berries, limnic fish, wild vegetables and mushrooms relies purely on guessing.

Interviews

Through interviews the present work serves to improve the knowledge within this field, although not claiming that the full answer will be achieved. The game animal statistics will also serve as an instrument to validate the results obtained in the investigation. The work was made possible due to financing from the NKS-EKO-2 programme.

2 Methods

Questionnaire

The investigation was carried out as a questionnaire involving 400 persons. They were interviewed on their consumption of products within the four categories: Game animals, Limnic fish, Mushrooms and Berries (table 1). They were also asked to answer questions concerning nationality, sex, age, education, employment and address. Further they had the possibility to give comments on their answers. The regional distribution of answers was compared to the distribution of the Danish population on regions see tables 2, 4 and 5. In this way a weighted mean consumption for the whole country could be calculated.

Participants

The 400 schemes were mainly distributed to persons living in Jutland and Zealand and the participants were mainly people employed within public administration and research. The participants were asked to distribute the questions further, in this way other employment groups were included in the investigation. Totally 220 answers were included in the treatment. Answers are still arriving and may later be included in a new treatment, especially if they can serve to throw light on new aspects.

Table 1. Products included in the questionnaire

Game	Limnic fish	Mushrooms	Berries
Roedeer	Pike	Chanterelle	Bilberry
Other deer	Perch	C. tubaeformis	Cowberry
Brown hare	Trout	Cep	Cranberry
Mallard	Crayfish	Bay bolete	Other
Pheasant	Other	Other boletes	
Wood pigeon		Agaricus spp.	
Geese		T. auratum	
Other		The gypsy	
		Milk caps	
		Russulas	
		Other	

Table 2. Regional distribution of the Danish population

Denmark	5.2 mill
Funen	0.5 mill
Jutland	2.4 mill
Zealand	1.0 mill
Great Copenhagen	1.3 mill

Source: After "Danmarks Statistik 1995"

3 Results

Frequency distribution

The frequency distribution of the answers on the categories are presented in table 3. It is seen that 30% (66 out of 220) do not eat the products in question at all. 44 % do not eat berries, 53 % do not eat meat from game animals, 66 % do not eat wild mushrooms and 78 % do not eat limnic fish. Totally 21 % eat less than one kg of products from nature during a year. For the single categories the corresponding percentages are: 32 % for berries, 25 % for mushrooms and game and 13 % for limnic fish.

Table 3. Distribution of the answers on each of the categories and totally as a function of the intake in gram.

Kg	Game	Fish	Mushrooms	Berries	Total
0	117	171	145	97	66
1	55	28	55	70	43
2	31	12	12	29	46
3	10	2	2	10	20
4	0	5	0	2	11
5	2	1	2	5	10
6	0	1	2	1	5
7	1	0	0	0	3
8	2		1	2	7
9	0		0	0	2
10	0		0		1
11	2		0		0
12	0		0		1
13			0		0
14			0		0
15			0		0
16			0		2
17			0		0
18			0		2
19			0		0
20			1		0
21			0		0
22					0
23					1
24					0

Average consumption

The average consumption of the categories and some selected products are presented in the Tables 4a-b. The largest average consumption takes place in Jutland with an individual average consumption of 2.9 kg, whereas the average in the rest of the country is near to 1 kg. The difference is mainly due to a higher intake of game meat and berries in Jutland compared to the rest of the country. The weighted mean for the whole country gives the result that as an average 2.09 kg is consumed totally and with a distribution on the categories as follows 0.62 kg of game meat, 0.26 kg of limnic fish meat, 0.40 kg of mushrooms and 0.71 kg of berries. When looking at the individual employment groups it is seen that the groups children, engineers, of-

fice employed, unknown employed and senior citizens have a use of these products that is less than the average. Biologists, other cand. spp. except engineers, pedagogues and technicians use more than the average. The consumption in the groups craftsmen, independents and workers include too few answers to be representative. In the case of the independents, the very high consumption is due to the presence of a farmer who is also a hunter. This may not be an extreme situation, since many farmers have the opportunity to be active hunters on their own land.

Berries

The weighted means of each product occurring in the answers is presented in table 5. It is seen that in the category berries, elderberry make up a large proportion of the total of berries - some wild strawberries and cherries are also included in the group other.

Table 4a-b. Consumption in gram of each of the categories, geographically and on employment groups.

	Game	Fish	Mushrooms (g)	Berries	Other	Total
Jutland	1.004	348	455	1.100	55	2933
Zealand	240	263	169	195	18	881
Funen	188	0	0	250	0	438
Copenhagen	366	178	623	203	14	1.274
Denmark	688	291	402	708	38	2.086
DK weight	619	256	398	620	32	1.884
Children	417	209	165	716	6	1.513
Biologist	822	836	970	906	104	3.514
Academic	831	169	1.363	275	31	2.466
Craftsmen	0	0	0	1.000	0	1.000
Independents	2.640	700	340	1.200	0	4.880
Engineers	234	230	220	205	0	879
Office	222	111	22	544	56	925
Senior	225	583	67	350	83	1.308
Pedagogues	1.373	723	438	1.575	38	4.027
Technicians	1.087	173	550	1.258	115	3.135
Workers	2.520	1.000	288	1.830	0	5.638
Unknown	435	22	174	371	0	1.005

	Roedeer	Pike	Perch	Cep	Bay bolete	Bilberry	Cowberry
Jutland	329	30	47	146	41	187	159
Zealand	46	97	36	48	20	6	9
Funen	0	0	0	0	0	0	0
Copenhagen	130	81	27	158	136	23	15
Denmark	217	55	40	120	51	110	94
DK weight	193	53	35	116	57	93	79
Children	226	30	0	74	9	146	90
Biologist	290	248	200	298	86	299	197
Academic	250	0	0	338	313	41	19
Craftsmen	0	0	0	0	0	0	0
Independents	120	220	0	140	80	0	0
Engineers	19	0	125	68	25	68	10
Office	39	0	0	3	0	61	75
Senior	33	333	0	33	0	0	0
Pedagogues	769	8	0	192	31	396	573
Technicians	456	10	48	173	77	100	131
Workers	120	300	0	68	0	0	10
Unknown	96	0	0	30	10	20	0

5 Discussion

Accuracy of the investigation

By combining game animal statistics on number of animals killed and a standard weight of the meat of each animal species, with the results for the consumption obtained in the questionnaire an estimate of the accuracy of the results of the investigation can be derived. This is done in Table 6 below.

Table 6. Comparison of the weighted average result obtained for Denmark on use of game meat, with the result obtained from the hunting statistics.

	Roedeer	Deer	Hare	Mallard	Pheasant	Wood pigeon	Geese	Other	Total
answer (g)	193	44	96	117	111	16	9	35	619
number killed	103.000	6.900	184.000	686.000	893.000	316.000	16.000	450.000	2.654.900
weight (g)	10.000	40.000	2.500	800	800	300	2.500	300	
wildlifestat.(g)	198	53	88	106	137	18	8	26	634
difference (g)	5	10	8	11	26	3	1	9	15
difference (%)	3	18	9	11	19	16	13	35	2

answer = average consumption from the questionnaire

number killed = the number of animals killed in 1994

weight = estimated weight of one average specimen

wildlifestat. = calculated average consumption

difference = the numeric difference between the result from the questionnaire and the calculated result

difference (%) = the percentage difference between the result from the questionnaire and the calculated result

The weight used in table 6 is the weight of the animal without internal organs, skin or feather and head, but bone included. The weights used are the result of a communication with Carsten Riis Olesen from the National Environmental Research Institute, Department of Landscape Ecology. They are not the result of a thorough investigation, rather they are estimates, which possible could be improved somewhat through an investigation. But that is yet another project.

It is seen that the percentage difference between the weighted result from the questionnaire and the result from the wild animals hunting statistics varies between 3 and 35%. Generally the deviation is less than 20%, though totally it only adds up to a percentage difference of 2. That is because some of the percentage differences have opposite directions, i.e. in some cases the result is an underestimation and in others an overestimation.

The question is now; can we believe that the results from the questionnaire are as reliable for limnic fish, mushrooms and berries as they are for game animals. There are no yes or no answers to that question, but rather a why not? Knowing the individual answers it is obvious that in the case of the *Lactarius* spp. an overestimation is likely because one individual is responsible for more than 90% of the average consumption in this case (Tab. 5).

Great variation

One feature that is very characteristic is the great variation there is on the individual consumption, employmental consumption and regional consumption. This is illustrated in the Figures 1-3. It is seen that the standard deviation is more than 200%, and for mushrooms around 500% (Fig. 1). Only a small proportion of the biologists have no use of the products in question, this is also true for the technicians

(laboratory personnel included) and pedagogues (Fig 2). The regional difference is illustrated in Figure 3. Only a little part of the Jutlanders belong to the category which have no use of natural products, in Zealand this proportion is larger and in Copenhagen more than 50 % do not consume products from natural ecosystems. The age seems not to be important for the behaviour as regards the use of natural products for consumption, there is though a tendency towards the youngest children and the oldest seniors having a slightly lower use than the rest (Fig. 4).

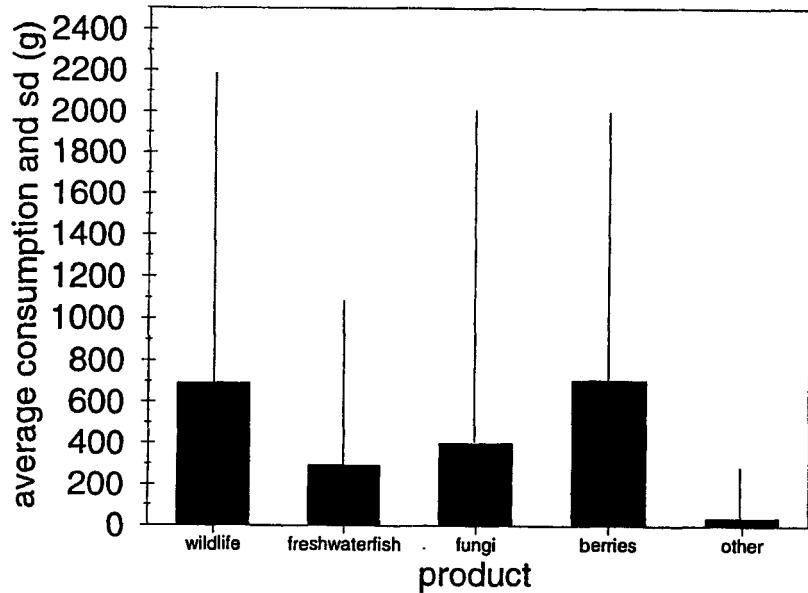


Figure 1. The average individual consumption on categories with the standard deviation represented as a line on top of the bar.

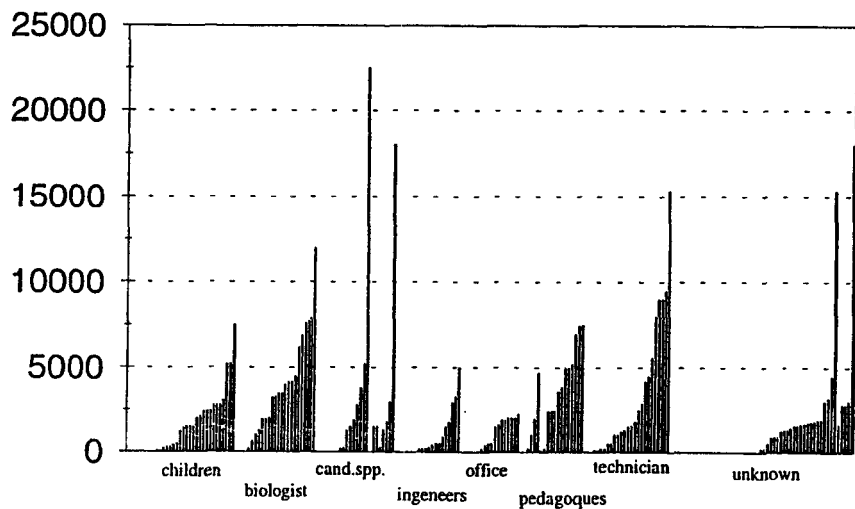


Figure 2. Comparison of the total consumption of natural and seminatural products among employment groups.

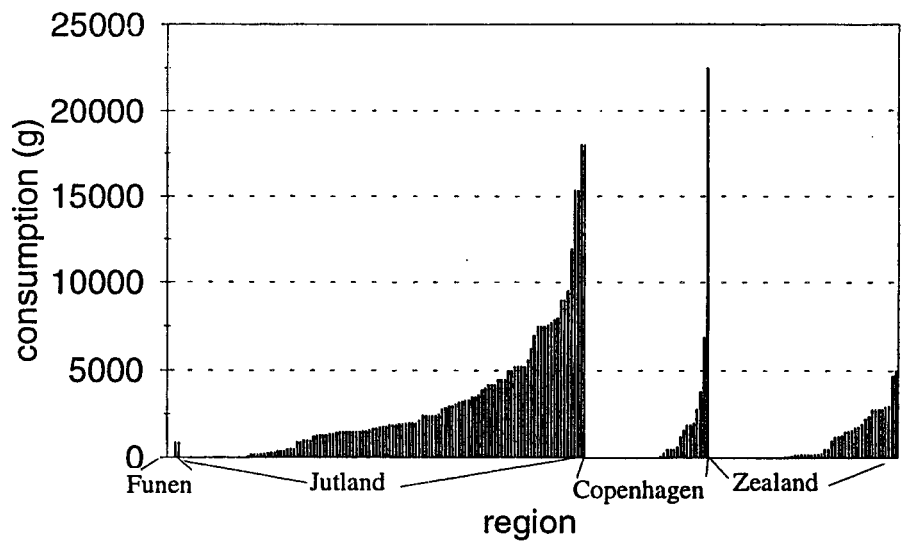


Figure 3. Danish regional differences in the consumption of products from natural and seminatural ecosystems.



Figure 4. The consumption of products from natural and seminatural ecosystems as a function of age of the consumer.

6 Conclusion

2 kg per year

The Danes use their natural and seminatural ecosystems to collect or shoot food products in an average amount of approximately 2 kg per year. Berries and game animals are the most important categories, whereas mushrooms and limnic fish are less important. Besides limnic fish, marine fish, not in trade, make up a part of the use of natural ecosystems that is not treated in this paper.

30% do not use edible products from nature

Totally 30% do not use consumable products from the nature at all, some of the rest buy natural products of Danish origin at restaurants or in shops. There is, however, great variation among those who use these natural products for consumption. The variation is primarily determined by geography, but education and employment is also very important.

The total average intake is in the order of 1% of the total consumption of food in Denmark. Hence it might be concluded that the value of natural and seminatural ecosystems as a food source is of minor importance in Denmark compared to the general recreative values these ecosystems offers to the population.

7 Literature

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The National Forest and Nature Agency (1996): "T. Asferg - Nedlagt vildt i sæsonen 1994/95" Vildtinformation. Skov- og Naturstyrelsen 1996.