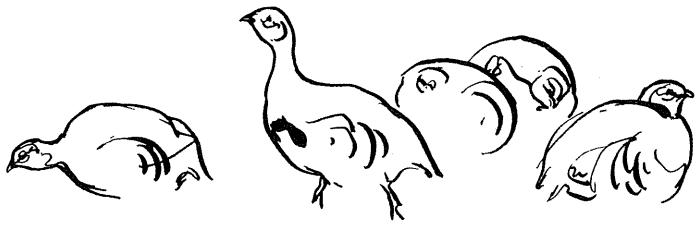
Food selection in a population of Partridge *Perdix perdix* in Danish arable farmland



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(Med et dansk resumé: Fødevalg hos Agerhøne Perdix perdix*)*

In recent years, especially since the mid-1950s there has been marked changes in agricultural practices in Denmark (Hansen 1987) as in several other European countries (Pulliainen 1984, Potts 1986, Dahlgren 1987). There has been a trend towards continuous cereal growing and away from traditional alternate husbandry. Simultaneously, cereal husbandry is approaching monoculture in the strict sense with a considerable decline in the abundance and variety of weeds (Potts 1970a, 1986). Recent developments in the use of herbicides has greatly reduced, if not eradicated some of the weed species in cereals (Andreasen et al. 1989, Hald & Reddersen 1990).This development has lead to a decline in the number of different bird species in the Danish agricultural landscape (Braae et al. 1988). The decline has also been evident in the Partridge and the numbers of birds shot have declined since 1960 (Strandgaard & Asferg 1980).

According to investigations in England (Middleton & Chitty 1937, Potts 1970a, 1986), Finland (Pulliainen 1965, 1966), Austria (Huss 1983) and Denmark (Hammer et al. 1958) Partridges eat different species of weeds accessible in late summer and autumn, but only a few species of weeds seem to be preferred. Grains from wheat and barley are also eaten in the autumn period. In winter and spring green foliage from winter cereals often dominate.

The food selection of the Partridge has not been subjected to detailed investigations in Denmark since the 1930s when Hammer et al. (1958) examined the crop content of 181 adult Partridges and 56 chicks. The aim of the present paper is to provide information on the seasonal food selection of adult Partridges as an indication of the effects of intensive agricultural practices on their survival.

Study area

The study area is situated in East Jutland, Denmark, about 17 km south of Århus and consists of 404 ha arable farmland. The soil is of high quality containing clay in most part of the area. The number of farms in the area is twenty-one, all land privately owned. The size of the farms varied from 4.4 ha to 110 ha with a mean of 19.2 ha, compared with a Danish mean farm size of 45 ha. Many types of crops were represented due to a great variation of animals on the different farms. In Tab. 1 the distribution of crops is shown for different periods in accordance with normal farming practices in the study area, the distribution being rather normal for Danish arable farmland.

All fields in the study area were conventionally cultivated using fertilizers and pesticides. The use of pesticides varied in type and quantity depending on the type of crop and time of year, the generalized scheme being: Winter wheat: one broad-

leaved herbicide, three fungicides and two insecticides. Spring barley: two broad-leaved herbicides, one fungicide and one insecticide. Root crops: four broad-leaved herbicides and one insecticide. Spring rape: threee broad-leaved herbicides, one herbicide against annual grasses and one insecticide.

Tab. 1. The distribution of the different crop types (ha) in the study periods.
Fordeling af de forskellige afgrødetyper i løbet af undersøgelsesperioden.

Crop type *Afgrødetype*	Aug.-Nov. 1985	Aug.-Nov. 1986
Stubbles of cereals *Korn-stubmarker*	168	191
Stubbles of rape *Raps-stubmarker*	10	16
Stubbles of peas *Ærte-stubmarker*	22	10
Beet *Roer*	20	31
Pasture/Undersown cereals *Græsmarker*	71	76
Winter cereals *Vinter-kornafgrøder*	49	57
Ploughed fields *Pløjemarker*	64	22
	Nov.-Apr. 1985/86	Nov.-Apr. 1986/87
Winter cereals *Vinter-kornafgrøder*	117	134
Stubbles *Stubmarker*	15	22
Pasture *Græsmarker*	48	51
Ploughed fields *Pløjemarker*	224	196
	May-Aug. 1986	May-Aug. 1987
Spring cereals *Vår-kornafgrøder*	143	132
Undersown cereals *Græsudlægsmarker*	38	29
Beet *Roer*	31	20
Spring rape *Vårraps*	43	30
Peas *Ærter*	10	14
Winter cereals *Vinter-kornafgrøder*	91	134
Pasture *Græsmarker*	48	45

In the three year period there was a rather constant number of approx. 9 pairs of Partridges, i.e. 1 pair per 45 ha, and 5 flocks with a variable number of birds during the flock-season.

The vegetation was qualitatively recorded every year in the different crops, hedgerows, field margins and around ponds to give a survey of the food available to the Partridges throughout the seasons. The fields were surrounded by a total of 25 hedgerows some of which were very old. The total length was about 8730 m and the width 4-6 m. The hedges contained a great variation of different plant species. One hundred and five species of grasses and weeds were identified. The most common species were *Senecio vulgaris*, *Rubus fruticosus*, *Arctium* sp., *Stellaria* sp., *Myosotis arvensis*, *Chenopodium album*, *Galeopsis* spp., *Lapsana communis*, *Dactylis glomerata*, *Elytrigia repens*, *Anthriscus silvestris*, *Taraxacum* spp., *Geum* sp., *Urtica* spp., *Hypericum* spp., *Polygonum* spp., *Poa* spp., *Phleum* spp., *Galium* spp., *Viola arvensis*, *Festuca* spp., *Cirsium* spp., *Lamium* spp., *Veronica persica*.

Field margins constituted a total length of 5535 m with a width between 0.5 m and 2 m. Ditches had a total length of 2353 m with a width that varied from 1.5 to 5.5 m. Five small ponds surrounded by bushes and trees covered 3 ha of the study area. The plant species in the field margins and the ditches were also identified to species.

In the different crop types in the area species of weeds and grasses were also recorded and a total number of 31 species were identified. Dominant species included *Artemisia vulgaris*, *Myosotis arvensis*, *Stellaria media*, *Chenopodium album*, *Lapsana communis*, *Capsella bursa-pastoris*, *Fumaria officinalis*, *Agropyrum repens*, *Trifolium* sp., *Matricaria* sp., *Equisetum arvense*, *Polygonum* sp., *Lolium perenne*, *Poa* sp., *Phleum pratense*, *Viola arvensis*, *Sinapsis arvensis*, *Festuca pratensis*, *Rumex acetosa*, *Spergula arvensis*, *Sonchus arvensis*, *Cirsium* sp., *Lamium purpureum*, *Euphorbia peplus* and *Veronica persica*.

Materials and methods

Faeces collection

The diet of the Partridges was determined by faecal analysis. Collections of faeces were carried out twice a week in the period August 1985 to August 1987 in connection with line transect observations of Partridge coveys and pairs (Rasmussen et al. 1989). The transect strip was chosen so that all fields in the study area were covered by a 100 m

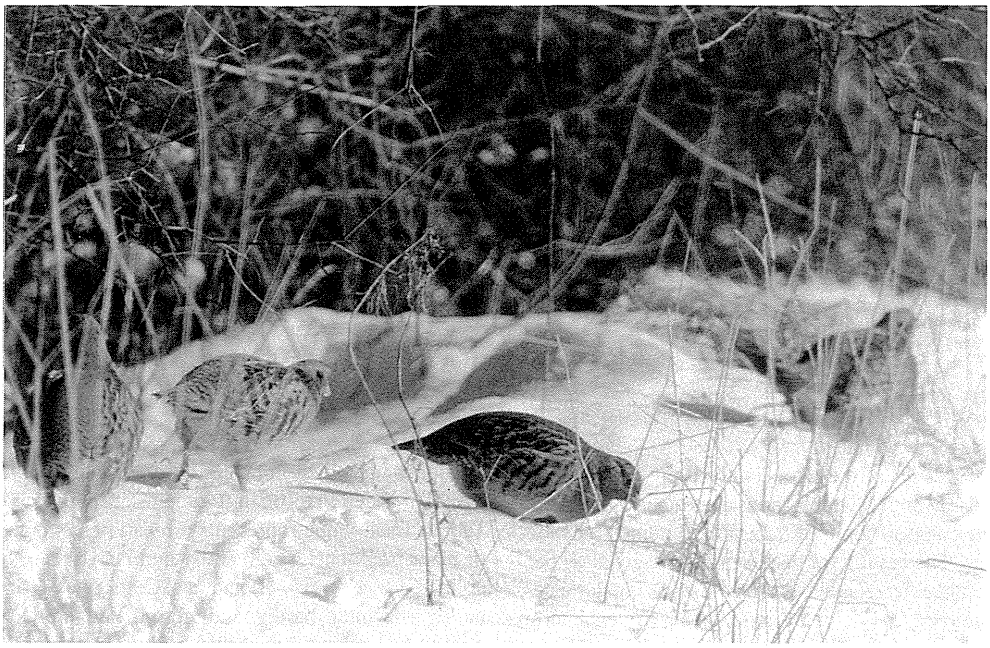

Photo: John Larsen.

belt. In the first year 61 samples containing 707 droppings were collected and in the second year 116 samples containing 1405 droppings.

Faecal analysis

Each dropping from the faeces samples was analysed (Green 1984). The dropping was placed on a filter paper and broken up in water with a needle. When the water had sieved through the filter the material settled evenly on the surface of the filter. Remnants of food items were identified by microscopic examination. The relative areas of fragments of seeds and grain testae, leaves, cotyledones or bract epidermis and insect cuticles were estimated under a binocular microscope at 12-25 × magnification. The different kind of food items were divided into four main groups: 1) green material of mono- and dicotyledones, 2) fragments of seeds and grain, 3) insect cuticle and 4)other material (roots, flowerbuds etc.). For each group an estimated percentage of the total area was determined.

Beside the quantitative estimation of the main groups a further identification of the different species of green matter, weed seeds, cereal grains, insects etc. was made. In the green material the frequency of occurrence of most species was calculated. From every faeces analysed 25 green epidermis fragments were taken at random and placed on a microscopic slide and the different species of mono- and dicotyledones were identified under microscope at 40-100 × magnification.

Reference material from the different cereals and weeds were collected from the study area. Photographs of leaves and stems were taken and microscopic slides were made for each species in order to illustrate all diagnostic characters (cell types, trichomes etc.). Fragments of insect cuticles, seed tests from weeds and cereal grains were also identified by means of reference material collected in the study area.

Classification of seasons

In the analysis of the contents in the faeces the year has been divided into five periods based on the changes which normally take place in farmland due to farming practices (Tab. 2).

The autumn period started when the crops were harvested in August. In October and November most fields were ploughed and sown. The remaining fields were left as unploughed stubbles, mainly undersown with clover or grass for next year's crop; some root fields and permanent pastures were present.

The winter period lasted from November to February and started when the winter cereals germi-

nated. It ended in spring (March and April) when Partridge coveys dissolute and pairs are formed. The spring period ended when spring cultivation began depending on weather and field conditions.

The late spring period is the period when the grain, grass and clover crops are growing rapidly. Any quantity of seeds of weeds or grasses can not be expected until the end of May, however. Finally the summer period lasts until the first crop is harvested.

Results

Seasonal variation

The results of the faecal analysis are given in Figs 1A-1D and 2, which show the seasonal change in the composition of different food items in the faeces. The results for each season are given as percentage by fragment area of individual faeces, summed to yield a single mean for each crop type where the faeces were collected.

The figures show that the relative importance of the various main food groups changed seasonally. However, in all seasons and in almost all samples green matter constituted a large part of the volume of faeces. The percentage by area of seeds and grains was much more variable, the highest values generally found in late autumn. In all seasons, a very low percentage of animal food was found and the only periods when insects formed an appreciable proportion of the total faecal area were during late spring (highest value 24%) and summer (highest value 21%).

In autumn (Fig. 1A) the composition of the various food groups showed the least variability between samples from different field types, green fragments making up 52-73%, seeds and grains 23-47% and insects 0-3%.

In the winter period considerable variability was found, depending on the field type where faeces were collected (Fig. 1B). High percentages of seeds and grains were still found in samples from stubble fields and ploughed fields. Especially in samples from ploughed fields the percentage of green plant material was rather low, i.e. less than 25%. Samples collected in hedges were variable, too, depending on the adjacent fields. Samples from winter cereal fields showed exclusively green matter in the faeces, other items making up 4% at most. In grass fields green material also dominated and seeds and grains made up only 4-16%.

The spring samples collected indicate (Fig. 1C) that the food in this period was totally dominated by green plant parts. Seeds and grains were only common in samples collected in ploughed fields.

In the late spring period green plant material was still dominant in the faeces samples (Fig. 1D). Other food items, especially seeds and grains but occasionally also insects, made up higher percentages than in other seasons. In summer (Fig. 2), samples from the different crop types showed extreme variability, ranging from total green matter dominance to a very even distribution of frequencies between all food categories.

Green matter

The species of green leaves from mono- and dicotyledones identified in faeces based on microscopial identification of plant fragments are shown in Tab. 2. Each value represents a mean percentage of plant fragments weighted by number of faeces collected at several (4-8) habitats. Cereal leaves of barley (winter barley and germinated spilled grains) had a high frequency during autumn and winter, while winter wheat was frequently found in winter and spring samples. Even in late spring and summer wheat leaves were eaten. Winter rye was only seen in few samples; it is, however, a rather uncommon crop in the study area. The most common wild and cultivated grass species were frequently eaten throughout the year – especially *Poa annua*, *Phleum pratense*, *Lolium perenne*, *Elytrigia repens* and *Festuca pratensis*. The herbs *Stellaria media*, *Myosotis arvensis* and *Polygonom* spp. were throughout the year the most common dicotyledones identified. Leaves of other common herbs as *Viola arvensis* and *Trifolium* spp. were only found in appreciable quantities during the summer months.

Seeds and grains

Fig. 3 shows the relative importance of the different species of seeds and grain identified in the faeces examined during the five seasons. Twenty-one species of weeds plus several grass-weeds were identified and the results are given as percentage occurrence (on a presence or absence basis) in the total number of faeces analysed each season from both study years. The species found in autumn differ considerably from those at other times of the year in the frequent occurrence of wheat (C in Fig. 3) and barley grains (A). Apart from grains, seeds of *Polygonum* (L, M, N), *Stellaria media* (F), *Viola arvensis* (Q) and *Chenopodium* (G) were frequently found. Grass seeds did not occur

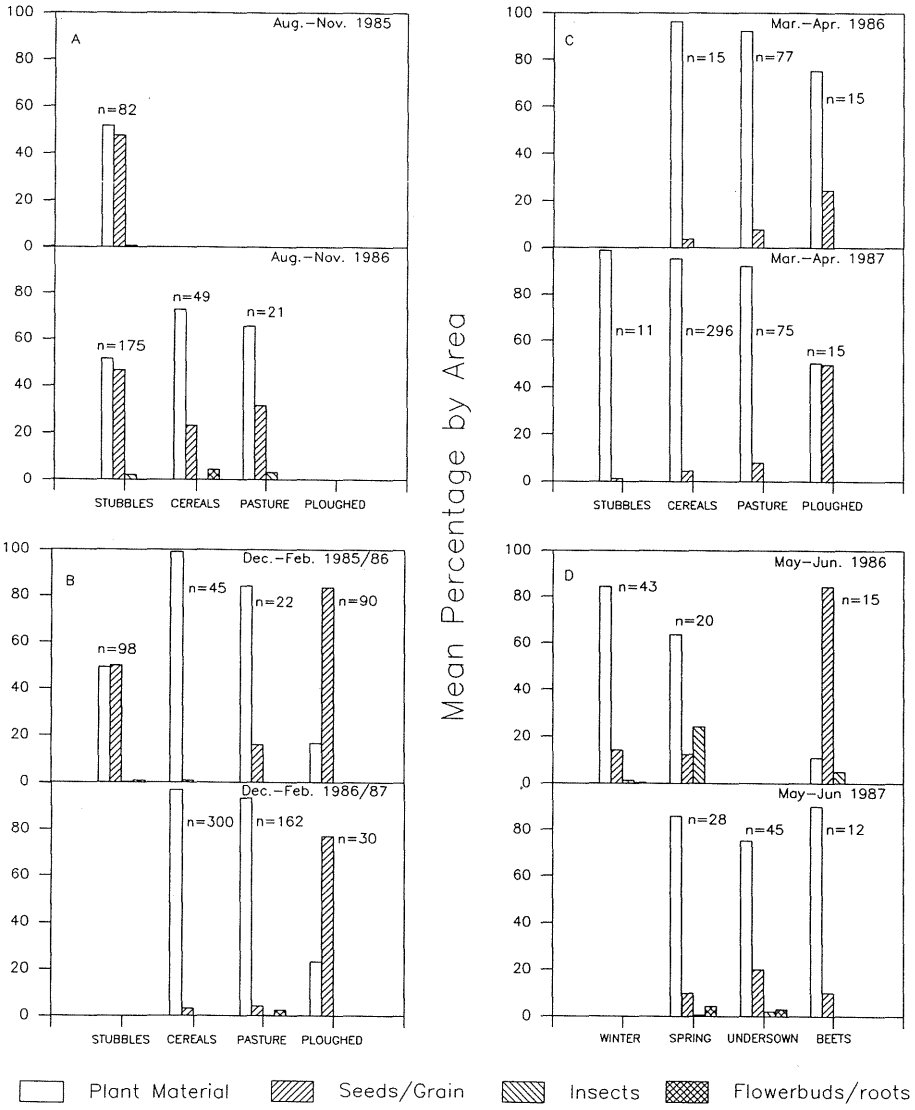

Fig. 1. The percentage composition by fragment area of food items in faeces collected from adult Partridges at different seasons in both study years.
Sammensætning af fødeemner i ekskrementer (pct af fragmentareal) hos Agerhøns i løbet af året.

very often in this period, the most abundant being the seeds of common grasses, *Poa annua* and *Lolium perenne*.

In winter and especially in spring grain and weed seeds were found less frequently than in autumn (Fig. 3). In contrast, the results from late spring and summer show that several other species were found in the faeces. *Fumaria officinalis* (K), *Plantago* sp. (T), *Atriplex patula* (R) and *Euphorbia peplus* (U) occurred more often in this period, but still in very low numbers.

Animal food

As already stated, animal food was important only during late spring and summer. The following families and species were identified in faeces collected from adult Partridges during spring and summer: *Blitophaga opaca*, rove beetles (Staphy-

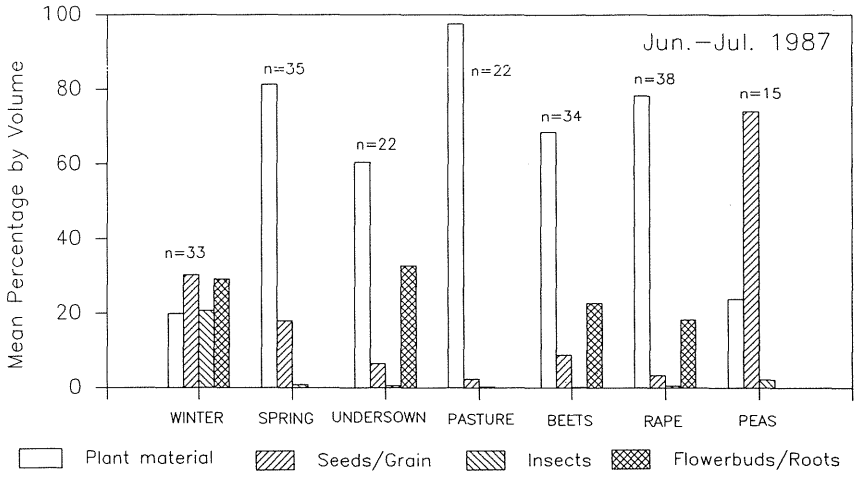

Fig. 2. The percentage composition by fragment area of food items in faeces collected from adult Partridges in fields with different crop types, summer 1987.
Sammensætning af fødeemner i ekskrementer (pct af fragmentareal) fra forskellige afgrødetyper, sommer 1987.

Tab. 2. Species of green leaves from mono- and dicotyledones identified in the faeces. Each value represents the percentage of green plant fragments identified.
Arter af en- og tokimbladede planter identificeret i ekskrementerne. Hvert tal repræsenterer procentdelen af de identificerede plantefragmenter.

	Season/No. faeces (No. crop types)				
	Autumn 327(4)	Winter 745(6)	Spring 504(7)	Late spring 166(6)	Summer 307(8)
Cereals *korn*					
Barley *byg*	20.5	6.0	0.1	1.4	2.0
Rye *rug*	0.0	0.0	6.3	0.0	0.0
Wheat *hvede*	3.0	17.7	20.6	12.2	5.2
Wild and cultivated grasses *vilde og dyrkede græsser*					
Elytrigia repens *alm. kvik*	0.9	5.3	4.9	3.1	6.6
Festuca pratensis *engsvingel*	0.8	3.0	4.7	0.9	0.0
Festuca rubra *rød svingel*	0.7	1.5	1.4	0.0	0.0
Holcus lanatus *fløjlsgræs*	0.0	0.0	2.0	3.0	0.4
Lolium perenne *alm. rajgræs*	12.7	23.8	18.1	14.1	13.9
Phleum pratense *engrottehale*	0.6	7.3	13.1	1.9	0.7
Poa annua *enårig rapgræs*	18.5	16.8	7.7	12.7	19.6
Poa pratensis *engrapgræs*	0.0	0.3	0.7	0.2	0.0
Weeds *ukrudt*					
Polygonum spp. *pileurt*	3.3	2.7	1.5	3.0	7.0
Stellaria media *fuglegræs*	18.8	8.4	14.1	18.3	27.2
Lamium spp. *liden/rød tvetand*	2.0	0.5	0.0	11.2	0.7
Myosotis arvensis *mark-forglemmigej*	11.6	3.3	4.6	10.8	11.0
Trifolium spp. *kløver*	0.2	1.2	0.2	2.4	3.2
Veronica spp. *ærenpris*	0.0	1.5	0.2	0.3	0.0
Viola arvensis *stedmoderblomst*	1.3	0.3	0.1	3.6	2.6
Unidentified *uidentificeret*	5.1	0.4	0.0	0.8	0.0

linidae), weevils (*Ceutorrhyncus* sp., *Phyllobius* spp., *Sitona* spp.), carabid beetles (*Agonum* spp., *Amara* spp., *Bembidion* spp., *Clivina fossor*, *Harpalus affinis/rufipes*, *Pterostichus* spp.), leaf beetles *Gastrophysa polygoni*, *Longitarsus* spp., *Oulema melanopus*, *Phyllotreta undulata*), Elateridae, Hydrophilidae, Diptera.

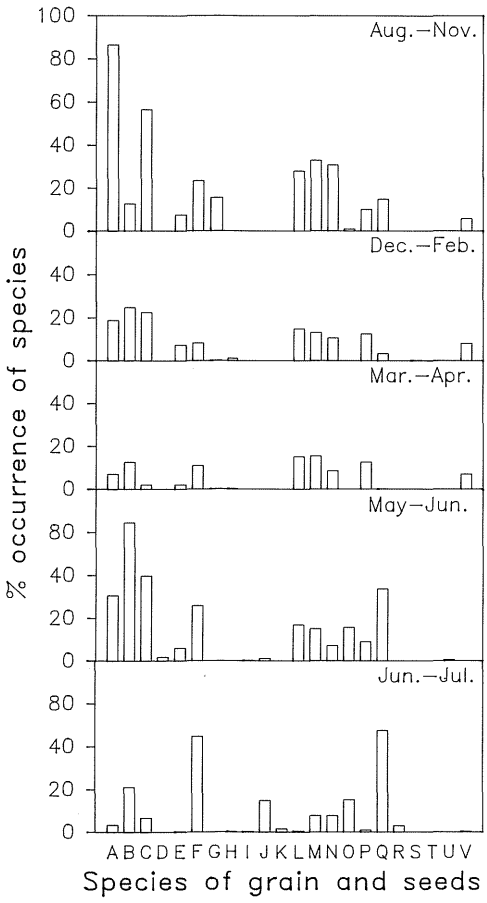

Fig. 3. Percentage occurrence of species of grain and seeds identified in faeces collected from adult Partridges at different seasons through the study period. The following species are represented: A) Barley (spring, winter), B) Grasses, C) Wheat (winter), D) *Artemisia vulgaris*, E) *Myosotis arvensis*, F) *Stellaria media*, G) *Chenopodium album*, H) *Galeopsis* sp., I) *Capsella bursa-pastoris*, J) *Cerastium* sp., K) *Fumaria officinalis*, L) *Polygonum persicaria*, M) *Polygonum convolvulus*, N) *Polygonum aviculare*, O) *Silene dioica*, P) *Rape*, Q) *Viola arvensis*, R) *Atriplex patula*, S) *Rumex acetosa*, T) *Plantago* sp., U) *Euphorbia* sp., V) *Veronica* sp.
Forekomst (%) af frø i ekskrementerne i løbet af undersøgelsesperioden.

Flowers and flowerbuds

Flowers and flowerbuds constitute a large part of main group 4 although roots were occasionally present. As seen in Fig. 1A-1D and 2 food items from this group were mainly found in faeces during the summer months. Flowers and flowerbuds were not easily recognisable and several remained unidentified. It was possible to identify species of some of the common weeds, *Stellaria media* and *Cerastium arvense*. Flowers from rape were also easily recognised.

Discussion

In the present investigation data on the food selection of Danish Partridges were obtained by means of faecal analysis. This method only allows a rough quantitative estimate of the different food items consumed as these items have different assimilation efficiencies (Jensen & Korschen 1947). Comparisons between the composition of diet items and items in the faeces have shown that the amount of green material is overestimated relative to seeds and grains (Green 1984). However, when green material make up a high percentage, as is the case in the present investigation, the estimates tend to be rather precise. Thus, we assume that the percentages by fragment area of the various food items in the faeces represent reliable estimates of the food consumed by Partridges.

The data presented here yield information on the seasonal variation and the within-field and between-field variability in food selection by Danish Partridges. Most other studies deal with the autumn period only, i.e. the hunting season. In that particular period Partridges in all fields are able to select food from a wide array of plant parts and species, and the faecal analysis demonstrates that the most even distribution of the various food groups are found in autumn. This is in agreement with other studies (Hammer et al. 1959, Pulliainen 1965, 1984, Potts 1970b, Huss 1983).

Partridges are farmland birds, and it is evident that farming practices, e.g. ploughing, sowing and spraying regimes, to a large extent influence the availability of potential Partridge food items. The present investigation demonstrates that throughout the season, the stable food supply of Partridges is green plant material. However, Partridges seem to select seeds and grains if available within the home range of the coveys. Thus the composition of crop types at a given time greatly influences the food choice.

Throughout the 1960s and 1970s spring sown

cereal (barley) fields dominated the Danish landscape, leaving up to 70% of the country ploughed during winter. In recent years, however, winter crops (wheat, rape) dominate. These changes probably imply that the stable food supply of Partridges has become more available. In terms of seed supply the situation is probably different. Stubble fields are rare and only in years with unusually late harvest are fields left unploughed through the winter. In addition the soil seed bank has decreased in recent years (Andreasen et al. 1989).

In grass fields and in under-sown cereal fields samples likewise indicated that Partridges took a certain amount of seeds. In Denmark these fields are decreasing in acreage as a result of a smaller number of cattle.

Seeds and green plant parts are nutritionally very different (Potts 1986). Generally, seeds are highly digestible, have a high energy and protein content and often a high fat content. Most green plant parts show low digestibility with a low energy and fat content. As a result, Partridges should generally use more pecks to sustain on a leaf diet than on a seed diet, which means longer feeding time (Dean (1978) in Potts 1986). In winter this could be a critical factor. However, young cereals contain a high percentage of protein (Pleshkov & Fowden 1959) and thus a diet consisting entirely of green cereal leaves might be nutritionally adequate.

In the present investigation insects made up a small fraction of the food consumed. This is in agreement with results by Potts (1986) and Dahlgren (1987) who consider insects to be of minor importance in the food of adult Partridges. In contrast chicks need insects in the first 3-4 weeks of life (Rasmussen & Steenfeldt 1988).

Although leaves of cultivated grasses and cereals made up a considerable amount of the identified green plant material, uncultivated grasses and weeds were very important. According to Haas & Streibig (1982) the top ten weed species in fields in Denmark are *Stellaria media*, *Poa annua*, *Plantago major*, *Polygonum convolvulus*, *Viola arvensis*, *Polygonum aviculare*, *Elytrigia repens*, *Chenopodium album*, *Taraxacum* spp. and *Myosotis arvensis*. The majority of the traditional cereal weeds in Denmark have declined in the past thirty years as a result of changed agricultural practice and the increasing use of herbicides. Species such as *Capsella bursa-pastoris*, *Sinapis arvensis*, *Sclerantus annuus* and *Sonchus arvensis* have clearly been reduced whereas species that show tolerance against herbicides are still widely distributed, e.g. *Stellaria media*, *Poa annua*, *Plantago major*, *Matricaria* sp., *Chenopodium album*, *Myosotis arvensis*, *Polygonum* sp., and *Atriplex patula*. In the present investigation most of these latter species occurred in the faeces of Partridges.

In most countries in Europe where studies of the diet of adult Partridge have been carried out, *Polygonum* species seem to be very important weeds in the diet (Middleton & Chitty 1937, Hammer et al. 1958, Huss 1983, Potts 1970b, 1986). *Chenopodium album*, *Stellaria media*, *Cerastium* sp. and *Myosotis arvensis* are other preferred species. The preference for *Polygonum* is due to the large size of the seed and to the regeneration of this species after harvest. Potts (1970b) found that the genus, especially *P. convolvulus*, formed 44% of the total dry weight of dicotyledone seed in Partridge food. Similar results were obtained in the early 1930s when a detailed study was carried out by Middleton & Chitty (1937). Chemical analyses of *Polygonum* seeds and of cereals suggest that a reduction in the availability of *Polygonum* spp. should not adversely affect the adult Partridges, if grain or growing cereals are available (Potts 1970b). The main importance of *Polygonum* spp. to the Partridge is probably that they support a number of insects on which the chicks can feed.

In the mid-1930s Hammer et al. (1958) observed that in Denmark especially *P. convolvulus* was of particular importance as a food item for adult Partridges. Seeds of *P. convolvulus* were found in 21% of the birds, *Stellaria media* in 18%, *Spergula arvensis* in 13%, *Chenopodium arvensis* in 8%, *Cerastium* sp. in 6% and *Poa annua* in 9%. In the present study the percentage occurrence of these species was 33%, 0%, 0%, 16% 24% and 13% respectively. Thus, *Polygonum* spp. are still important in spite of the changes in agricultural practice in recent years.

Until recently the nutritious seeds of *Galeopsis* spp. made up approx. 35% of the autumn diet of the Finnish Partridges (Pulliainen 1965, 1984). Since 1978-80, however, *Galeopsis* spp. have decreased by more than 20% in the diet and the disappearance of these species may be fatal to the Partridge in Finland. Seeds of *Galeopsis* spp. seem to be unimportant as food for the Partridge in the Danish study area, the percentage occurrence being only about 1% during most of the year.

In conclusion, the results suggest that the Partridges in our study area at the present population density have little problems in finding sufficient food of good quality throughout the year. In

the critical winter and spring months they are often able to find grain, rape seeds and other seeds, and the extensive areas with winter cereals form an important stable food supply. There is little reason to suspect a decline in survival rate or deterioration of the condition of adult Partridge in this area due to availability of food. However, in other areas of Denmark with larger fields and fewer small biotopes we suspect that Partridges may be unable to find adequate food conditions through part of the year and that this has lead to reduced population levels. In our study area other factors appear to be more important than food shortage in the decline of the Partridge, with increasing mortality rates of the chickens and deterioration of nesting habitats as the most likely causes (cf. Green 1984, Rands 1985, Potts 1986, Dahlgren 1987, Rasmussen et al. 1989).

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Resumé

Fødevalg hos Agerhøne *Perdix perdix*

Landbrugsområderne har gennem de sidste 30 år ændret sig. Dette har bl.a. vist sig ved en større ensidighed i afgrødevalget, en forøgelse af markernes størrelse og en stadig større brug af maskiner og pesticider. Disse ændringer har betydet, at der er konstateret en forarmelse i den flora og fauna, der knytter sig til landbrugsområderne. Agerhønen er en typisk agerlandsfugl og antallet af denne art er faldet siden 1960erne.

Forskellige udenlandske undersøgelser viser, at Agerhøns primært spiser frø (fra ukrudt/korn) om sommeren og efteråret. Om vinteren og foråret spiser fuglene primært grønt (korn-afgrøder). Fødevalget hos Agerhøns i Danmark har ikke været undersøgt siden 30erne, og den undersøgelse blev hovedsageligt udført på fugle skudt i jagtperioden.

Formålet med nærværende artikel er at præsentere, hvad voksne Agerhøns vælger som føde året igennem. Det skulle således være muligt at sige, hvilken indflydelse moderne landbrug har haft på fuglenes fødevalg og overlevelse. Til at undersøge dette blev der indsamlet ekskrementer i to år (aug. 1985 til aug. 1987) i et landbrugsområde syd for Århus. Ialt er analyseret 177 prøver som tilsammen bestod af 2112 ekskrementer. Resultaterne af analyserne er vist i Fig. 1A-1D, 2, 3 og Tab. 2.

Om efteråret udviser prøverne en lille variation mellem de enkelte afgrødetyper og føden udgøres af grønt plantemateriale, ukrudtsfrø og spildkorn. Derimod er der stor variation om vinteren afhængigt af afgrødetypen. Prøver fra vinterafgrøder og græsmarker udgøres næsten udelukkende af grønt. Modsat indeholdt prøverne fra pløjemarken en stor procentdel frø fra ukrudt og afgrøder (specielt raps). Om foråret ses at prøverne totalt domineres af grønt plantemateriale. Prøvene fra pløjemarker viser, at fuglene gerne tager frø, hvis det er muligt. I forsommeren dominerer grønt plantemateriale stadig. Enkelte prøver fra vårafgrøder viser en større procentdel af insekter end på noget andet tidspunkt, og prøverne fra 1986, roer, viser en meget stor procentdel af frø og korn.

I Fig. 3 er de forskellige identificerede frøtyper angivet. Om efteråret udgøres en stor del af frøene af hvede (C) og byg (A), i mindre omfang pileurt (L, M, N), fuglegræs (F), agerstedmoderblomst (Q) og gåsefod (G). Om vinteren og specielt om foråret udgør frø en mindre del. Om sommeren udgør frø igen en større del af føden, og desuden optræder andre arter end om efteråret (lægejordrøg (K), vejbred (T), svinemælde (R) og gaffelvortemælk (U)), dog i lille omfang.

Fordelingen af grønt plantemateriale er angivet i Tab. 2. Her kan ses, at vinterhvede og byg (vinter/vår) dominerer blandt kornafgrøderne som fødevalg for fuglene. Disse to afgrøder dominerer også afgrødevalget hos landbrugerne (Tab. 1). De mest almindelige græsarter, både hvad angår forekomst i frøgræsblandinger anvendt på markerne, blandt vilde græsser og i fuglenes føde er rapgræs, rottehale, rajgræs og rød svingel. Fuglegræs og markforglemmigej er de eneste tokimbladede planter, som fuglene spiser i større mængde. Undersøgelsen viser, at Agerhøns vælger de fødeemner, som forekommer i størst mængde på det pågældende tidspunkt af året, bortset fra grønt plantemateriale, der forekommer hele året. Frø fra ukrudt og korn udgør den største andel om efteråret, hvorimod der er en stor variation resten af året. Insekter udgør kun en større del af ekskrementerne om foråret. Fuglene har tilsyneladende ingen problemer med at finde nok føde året igennem, og i de kritiske perioder (vinter/forår) er de istand til at supplere føden (grønt plantemateriale) med frø, som har et større energiindhold.

Det kan derfor konkluderes, at de adulte fugle i forsøgsområdet næppe med den nuværende tæthed har mangel på føde, hverken i kvantitet eller kvalitet. I dette område er antallet af fugle formodentlig begrænset af andre faktorer, såsom mortalitet hos kyllingerne og dårlige redehabitater. Vi antager derimod, at der i andre dele af landet med færre småbiotoper og større marker vil være dårligere fødemuligheder med deraf følgende lavere populationstæthed.

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