

FID Biodiversitätsforschung

Mitteilungen des Vereins Sächsischer Ornithologen

Effects of protection on the population dynamics of the Jackdaw (*Corvus monedula*) in Finland

Antikainen, Eero

1999

Digitalisiert durch die *Universitätsbibliothek Johann Christian Senckenberg, Frankfurt am Main* im Rahmen des DFG-geförderten Projekts *FID Biodiversitätsforschung (BIOfid)*

Weitere Informationen

Nähere Informationen zu diesem Werk finden Sie im:

Suchportal der Universitätsbibliothek Johann Christian Senckenberg, Frankfurt am Main.

Bitte benutzen Sie beim Zitieren des vorliegenden Digitalisats den folgenden persistenten Identifikator:

urn:nbn:de:hebis:30:4-131593

Effects of protection on the population dynamics of the Jackdaw (*Corvus monedula*) in Finland

by EERO ANTIKAINEN

1 Introduction

In recent decades the necessity of nature protection has become a widely adopted idea in Finland. The need to maintain high local biodiversity values, not excluding the densely populated human settlements, has brought up the issue of protection concerning the colonially nesting birds formerly classified as harmful species (VUORISALO & TIAINEN 1993, HAMARI et al. 1995). The Jackdaw, „naakka“ in Finnish, well exemplifies this category.

In Finland the protection status of the Jackdaw can be traced back to the end of the last century (see Tab. 1). The documents show that during this century protection and

non-protection have altered. The negative consequences of uncontrolled nesting cumulated in the 1950's (BRANDER 1953 and 1958), and 35 years ago it led to the removal of the species from the list of the protected birds. This amendment of the law legalized the „persecution“ of the Jackdaw colonies and deteriorated the status of the species living on the northern margin of its distribution (ANTI-KAINEN 1968 and 1978, HAARTMAN et al. 1969). The process coincided with the negative population trends in Central Europe, e.g. in Germany and Switzerland, which were caused by Man-induced environmental changes as pointed out by DWENGER (1989) PETER (1994), HENNIG (1994) and VOGEL-BAUMANN (1994).

Table 1. Status of protection of the Jackdaw in Finland (source: written information from the Ministry of Environment February 25, 1997).

Case	Year	Statutes/Paragraphs of Law	Protection
(1)	1898	His Imperial Majesty's statute on hunting N:o 45, § 17. (Grand Duchy of Finland).	protected
(2)	1923	The Republic's first law of nature protection 71/23, § 13 (The Jackdaw on the list of protected birds).	protected
(3)	1962	Amendment of the law of nature protection 71/23. (The Jackdaw was removed from the list of protected birds).	not protected
(4)	1987 (ca.)	Reform process of the hunting law. A new basic principle was that all the other animals (including the Jackdaw) will be protected except game animals and harmful species.	Process for Protection
(5)	1992	In the Bill (1992 vp-HE 300) for the new hunting law the term „harmful animal“ was changed into „unprotected animal“. The Jackdaw was on the list of harmful animals.	not protected
(6)	1993	During the process of reforming the hunting law the Committee on Agriculture and Forestry amended the list of unprotected animals by removing the Jackdaw from it.	protected
(7)	1996	The new hunting law (615/93) came into effect on August 1. In the renewed nature protection law (1096/96) the respective paragraph is § 38.	protected

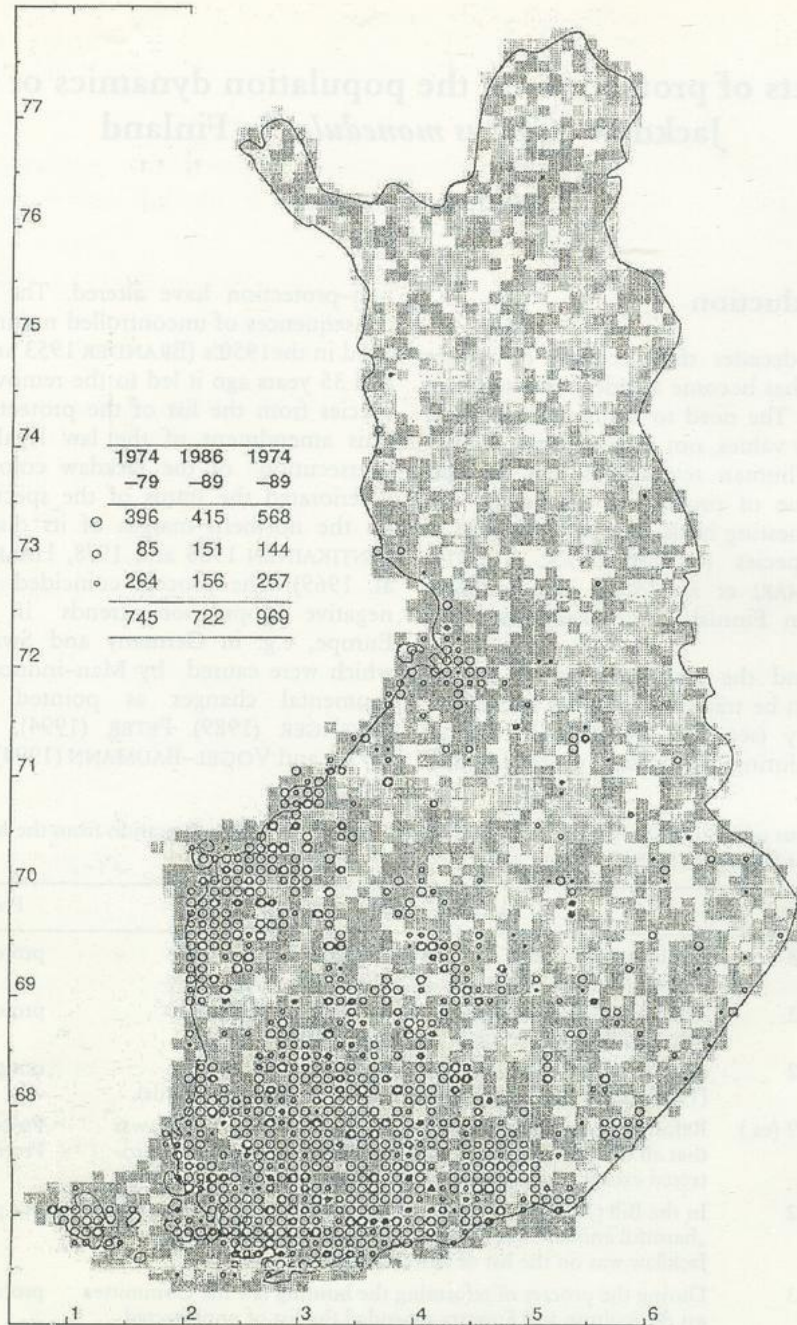


Fig. 1. Main study populations and breeding status according to Atlas Data 1997 (VÄISÄNEN et al.). Populations: 1. = SW-Finland, Åland and S-Finland, 2. = Southbothnia, 3. = Northbothnia (Oulu) and 4. = E - Finland. For the grid squares see the text. Breeding status in circles and four categories: breeding confirmed, breeding probable, breeding possible, breeding improbable.

From the beginning of the 1970's while the Jackdaw in Finland was still officially unprotected, public opinion – particularly through the media – turned positive toward nature protection. This created favourable soil for the reevaluation of the role of the Jackdaw as a part of the Finnish cultural environment. In this dynamic process unmaterialistic, e.g. aesthetic values and behavioral patterns were balanced and the image of the Jackdaw was connected with the church milieu (PULKKINEN & POUTANEN 1986, ANTIKAINEN 1968 and 1994a). E.g. in the parish of Muhos the Jackdaw was voted the local emblem bird. The reform of the hunting law was commenced at the end of the 1980's and in 1993 the Jackdaw became again officially protected (The Ministry of Environment information February 25, 1997).

The changes of protection have had effects on the population dynamics, which control the whole survival strategy of the Jackdaw in Finland. The aim of this report is to evaluate these factors (see e.g. FOLK 1968, ANTIKAINEN 1978 and LÜTKEPOHL 1994).

2 Study area, materials and methods

As seen in Fig. 1 the study area consists basically of the whole country (ca. 60°–70° Nlat and 19°–32° Elong, 338.000 km²). My data collected previously for my nationwide study (1964–1974, ANTIKAINEN 1978) and additional data (1993–96) are from 43 localities categorized into two major study areas i.e. South (=S) and North (=N), northwards from ca. latitude 62°30' (see also ANTIKAINEN 1970, 1975, and 1994 b). The populations/regions 2–4 belong to N. The field study material collected in 1986–1996 by EERO LINDGREN is obtained from Northbothnia, Oulu and Oulu River Valley (population 3). This part of the study area is typical coastal lowland characterized by urban and suburban areas, cultivated fields, small lakes, ponds and riversides (TORNBERG 1997). I have dealt with the physiognomy and the habitats of the other parts of the country in my former study (ANTIKAINEN 1978).

As for the sizes and sites of the colonies, I have resurveyed the nationwide material provided by

439 questionnaire answers and also the inquiry into the urbanisation of birds (TENOVUO 1967, see ANTIKAINEN 1978). In addition, by checking the reports published on the local avifaunas, I managed to collect data on 774 breeding Jackdaw colonies from different years with information on their locations, intracolony nest-sites and sizes (number of breeding pairs). A colony was regarded as its own unit when it was at the minimum distance of 100 meters from the one next to it (cf. e.g. LÜTKEPOHL 1994). Altogether 80.2 % colonies are from S (n = 621) and 19.8 % from N (n = 153). Totally 28.3 % are from 1940–63, (n = 219), 60.9 % from 1964–77 (n = 471) and 10.9 % from 1978–96 (n = 84).

Remarkable quantitative material is provided in the unpublished data by VÄISÄNEN et al. from February 24, 1997 given to my disposal. The data is part of the nationwide Bird Atlas Project (Atlas Data 1997 in VÄISÄNEN et al. 1998). The material for this extensive study has been collected since 1985, while the data of the previous Atlas are from 1974–1979 (HYTTIÄ et al. 1983, cf. SHARROCK 1980). In the Atlases the data are based on altogether 3856 grids covering the whole country and consisting of 10x10-kilometer squares. On the map (Fig. 1) the degrees of coverage are categorized as follows: good, fair, adequate, occasional records and no observations. For breeding the following definitions are used: breeding confirmed, probable, possible and improbable (see Tab. 2). In the Atlas Data the indexes of the long term and annual breeding fluctuations are calculated on the basis of the results of transect line censuses (TLC) so that the mean of four census periods denotes number 100 (on the methods see also MERIKALLIO 1946, JÄRVINEN & VÄISÄNEN 1973 and 1977 and VÄISÄNEN 1985). In addition, both the data of Atlas 1983 and of Atlas 1997 include also the local censuses on the Jackdaw colonies (HYTTIÄ et al. 1983, VÄISÄNEN et al. 1997).

Though there are some „historical“ literature data from the end of the last century, the majority of the records in this study agglomerate in the period of 1941–96.

3 Results

Protection. Table 1 shows the history of protection status in Finland since the end of the 19th century up to 1996 with seven different cases. The fact that the Jackdaw was

considered a harmful bird species or not has been justified as follows:

A. Damaging to other organisms: it (1) expels small birds, (2) feeds on the seeds and sprouts in fields, (3) feeds on seedlings in flowerbeds, (4) distributes sicknesses (viruses), (5) pulls up flowers from flowerpots and carries them away, (6) plunders eggs and chickens from the nests of protected birds, (7) picks up nest material e.g. hair from carpets and furs brought out in the spring time, (8) carries away people's glossy objects, (9) is a noisy bird and disturbs funeral services in the graveyards and (10) feeds on the remains of other Jackdaws, i.e. is a cannibalistic bird.

B. Damaging to property and materials: it (1) fouls places with its urine acid causing corrosion, (2) carries litter and spreads deposits from garbage bins and pits, (3) is a nuisance at garbage dumps, (4) blocks chimneys by nest material, (5) large flocks at wintering and roosting sites break up antennas, branches of trees etc. (6) breaks glass windows (cf. ZIMMERMANN 1951), (7) indirectly causes fire risk by carrying dry nest material e.g. into attics and transforming stations and (8) causes short circuits when nesting in technical constructions (see BRANDER 1953, 1958, ROELL 1978, ANTIKAINEN 1981 and 1994a).

C. Evaluation of the benefits of the Jackdaw is based on the following statements: it (1) belongs to the milieu of medieval churches, castles, and ruins, (2) consumes a lot of harmful insects as its nestlings also feed on them, 3) by utilizing garbage promotes sanitation in the environment, (4) the nice calls of Jackdaw are part of audible nature, (5) produces guano, which was formerly sold to farmers in Finland (Västra Nyland 1923), (6) it is an amusing, intelligent bird, (7) its behavior is interesting to observe, (8) „Jackdaws are priests' souls“ and must be protected (Church Archives in Mynämäki), and (9) it is an emblem bird in some parishes. The damages listed above led to measures to control large populations (breeding pairs > 15) mainly in S- and SW-Finland even during the period of protection in 1898–1962. This was carried out at exceptional permits granted by provincial administration. Emphasis on harm done by the Jackdaw also led to the lifting of the protection in 1962. Especially birds in the large church colonies were poisoned, clutches were destroyed, nest-holes closed and chimneys blocked with chicken wire. According to my rechecked material from the 1960's the Jackdaw was completely evicted from 17 % of the churches they ever inhabited (n = 119). In all 58 % of colonies moved into chimneys,

Table 2. Breeding population and distribution of the Jackdaw in Finland according to 10×10-kilometer Atlas squares (MERIKALLIO 1958, ANTIKAINEN 1983 and VÄISÄNEN et al. unpublished data = Atlas Data 1997). Letters denote Atlas squares: A = breeding confirmed, B = breeding probable, C = breeding possible and D = total number of squares with Jackdaw records. The numbers refer to the following study regions (areas): 1 = SW-Finland, Åland and S-Finland, 2 = Southbothnia, 3 = Northbothnia (Oulu) and 4 = E-Finland (see ANTIKAINEN 1994 b).

Periods	Breeding pairs	Atlas squares				Protection
		A	B	C	D	
1940–	8.000		Transect Line Census			protected
1941–1963	17.000					protected
1974–1977	29.000	396	85	264	745	not protected
1986–1989	71.000 (?)	415	151	156	722	not protected
1974–1989	50.000	568	144	257	969	not protected
1993–						protected

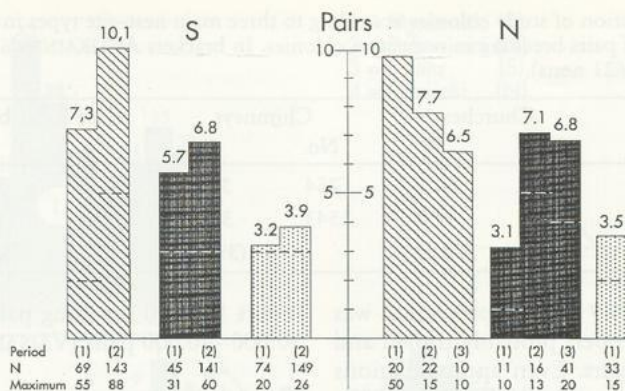


Fig. 2. The mean sizes of colonies in the south (S) and in the north (N). The shaded columns indicate church colonies, blackened chimneys and dotted tree holes and nesting boxes. Below are study periods: (1) 1941–63, (2) 1964–77 and (3) 1978–1996, the maximum sizes of colonies and numeruses. Broken line inside the columns indicates the value of mode.

30 % into tree holes and only 12 % to other churches and chimneys (cf. ANTIKAINEN 1968). The distance to the new location ranged 0.5–20 kilometers with the mean of 4.6 kilometers (see e.g. UNGER 1994).

Quantitative results. Since there are data available on the quantities from the 1940's the decades are divided into five periods respective to the altered status of protection seen in the Table 1.

The estimations from before 1940 and 1941–1963 are based on TLC (MERIKALIO 1946 and 1958), which gives a rough number of 8.000–17.000 breeding pairs (Tab. 2). In 1964–1973 there are quantitative estimations only of the number of colonies and their sizes (Fig. 2). According to Atlas Data 1997 (VÄISÄNEN et al.) in 1967 there was a count of 535 Jackdaw colonies. Approximately

30 % of them were situated in tree holes or nesting boxes and 70 % in buildings of villages and towns. The distribution of the colonies of the present study (Tab. 4) as well as the distribution of the number of nests to nest-site types in my previous study (results from the year 1967, ANTIKAINEN 1978) are very similar. However, according to my present data including also the years 1964–1973, the proportion of pairs breeding in churches is much higher, i.e. 49 %, but the proportion of tree holes is respectively lower, 19 %. As seen in Fig. 2 the mean colony size from the same period is higher in S, 10.1 pairs while in N 7.7 pairs. The majority of large colonies of more than 15–30 breeding pairs are located particularly in SW-Finland (ANTIKAINEN 1983).

The results from the 1970's and the 1980's indicate the distinct increase in breeding

Table 3. Areal distribution of the breeding population of the Jackdaw in 1974–89 according to unpublished Atlas Data 1997 (VÄISÄNEN et al.). The percentage of each region of the total area of Finland.

Region (Zone)	Density (pairs/km)	Abundance (%)	Breeding area (%)	of total area (%)
SW-Finland and Aland	1,4	0,5	40	4
S-Finland	0,2	0,1	59	39
Tornio-Kainuu (N- and NE-Finland)	< 0,01	< 0,01	1	19
Lapland	–	–	–	38
Total Area	0,1	0,09	100	100

Table 4. The distribution of study colonies according to three main nest-site types in the study years and the total numbers of pairs breeding in respective colonies. In brackets ANTIKAINEN'S (1978) results from the year 1967 (n = 2621 nests).

	Churches		Chimneys		Tree holes/boxes		Total
	No.	%	No.	%	No.	%	
Colonies	264	34.1	254	32.8	256	33.1	774
Breeding pairs	2371	49.0	1543	31.9	927	19.1	4841
ANTIKAINEIN (1978)		(28.1)		(39.3)		(32.6)	(100)

populations. By 1989 when re-protection was in process, the numbers probably tripled and exceeded 50.000 pairs. Even approximations of 71.000 pairs were given (Atlas Data 1997). KOSKIMIES (1993) evaluated the total breeding populations: 40.000–60.000 pairs. As seen in Table 2 the total number of Atlas squares with positive breeding records increased 34.2 % (from 722 to 969) at the same time. In spite of this trend, ca. 70 % of the pairs still breed in S, although the average density is probably only 1–2 pairs/km² and abundances 0.5–0.1 (Tab. 3). Because of its colonial nesting habits, the Jackdaw is unevenly distributed so that there are low and high density areas also amidst of S. In the 1970's the densities in the groves in Åland varied from 4 to 7 pairs/km² and in densely build-up areas of SW-Finland density increased in the 1980's up to 56 pairs/km² (i.e. 83 % of all breeding pairs of the area, VÄISÄNEN et al. 1997). VUORISALO & TIAINEN (1993) report 50 individuals/km² in warehouse and industrial suburbs of Turku. On the contrary, population density and abundance in N, which consists 57 % of the area of the country includes Tornio-Kainuu and Lapland, is only < 001. Here the total population is 700 pairs (1986–89). It has more than doubled since 1974–77 (Atlas Data 1997).

The wintering population is estimated to be very changeable: 20.000–50.000 Jackdaws. The estimation is mainly based on the published results of winter bird censuses (KOSKIMIES 1993). The biggest towns (>50.000 inhabitants) located mostly on the coast are popular wintering sites (up to 1.000 birds/town, VUORISALO & TIAINEN 1993 and SALMELA 1995). Recent censuses in Sweden

report 150.000 breeding pairs and in Estonia 30.000–40.000 pairs (VÄISÄNEN et al. 1997).

Population dynamics and distribution. At the end of the 1920's the distribution of the Jackdaw reached the line Ulvila – Hattula – Hauho – Hollola – Pälkäne – Kuhmoinen – Imatra (ca. 61°30' N lat) with separate islets on the coast of Southbothnia and near Lake Oulujärvi (KIVIRIKKO 1926 and HAARTMAN et al. 1969, see Fig. 1). A decade before and after the withdrawal of protection in 1962 the Jackdaw inhabited the area south of the line Vaasa–Jämsä–Lappeenranta. It also populated the coastal strip of the Gulf of Bothnia up to Oulu, ca. 65° N lat. Sporadically the species nested in the central part of the country, and also elsewhere in N and E. As indicated before, population dynamics operate in S through colonies in woods and churches with significantly higher breeding success (ANTIKAINEIN 1978). Therefore, these southern colonies function as centres of expansion in spite of evictions from churches. According to the faunistic data and my personal observations, Jackdaws have gradually recolonized the churches they were evicted from. These colonies have again become expansive ones (cum TÄHTINEN, pers. comm. 1997). As indicated by the mean sizes of colonies in Fig. 2, the colonies in chimneys as well in trees have grown bigger. In addition, new colonies were established to 44 localities.

At the beginning of the 1970's permanent breeding colonies occupied Central-Finland and some localities in E. Also the population round Vaasa and Pietarsaari became stronger. By the 1980's and the 1990's the N-populations in Oulu and Oulu River Valley re-

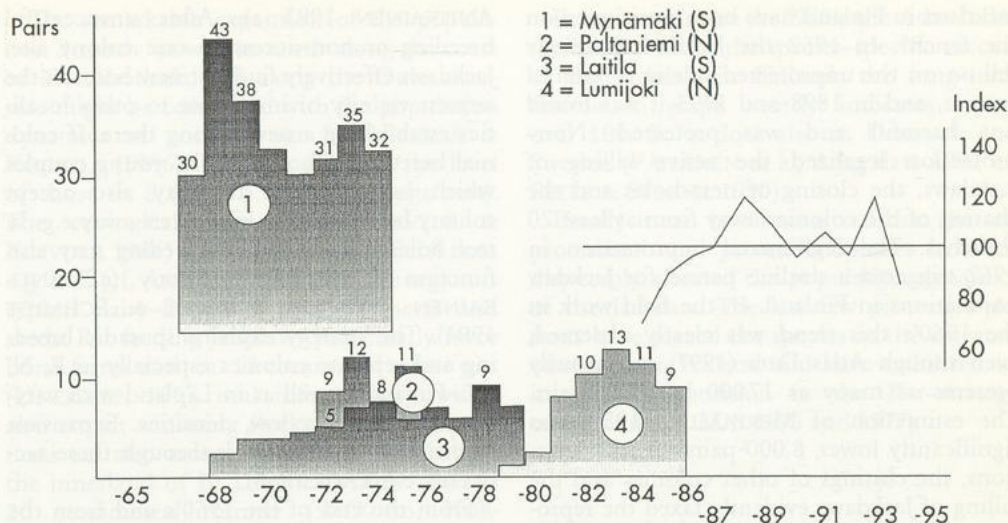


Fig. 3 Annual fluctuation in four local breeding colonies and the Atlas Index (see text). The colonies are: 1. = Mynämäki (church, S), 2. = Paltaniemi (church, N), 3. = Laitila (church, S) and 4. = Lumijoki (nesting boxes, N, HIRVELÄ & KOIVULA 1986).

ceived reinforcement and expanded up to Ii, occasionally to Kemi-Tornio (see Fig. 1). Simultaneously the average size of the colonies in chimneys increased from 3.1 to 6.8. Also new colonies with an average size of 3.5 pairs were established in tree holes. In 1988 totally 30 colonies were counted in the Northbothnia region (a mean of 5 pairs/colony, KIRKKOMÄKI 1990). HIRVELÄ & KOIVULA (1986) have revealed that breeding success (BS) in as far north as Lumijoki is significantly higher in tree colonies than in building colonies in N compared to ANTIKAINEN's (1978) studies: 2.65/1.3 fledglings/pair, $p < 0.001$.

Fig. 3 shows the annual fluctuation in four of my study colonies checked in yearly sequence. Two colonies are from S and two from N. The figure also indicates the annual fluctuation of the Atlas indexes in 1984–1994. Except the first three years and the last year, the graph of index fluctuates above the mean (100).

4 Discussion

During the last few decades long-term avifauna monitoring has risen in value as an indicator of the environmental changes. Strongly bonded with densely built-up areas and to the availability of nest-holes in natural habitats, the Jackdaw is highly dependent on man's manoeuvres. (FOLK 1968 and 1970, HILDÉN 1985, LIEBERS 1994, PETER 1992 and 1994). The laws of protection affect the population indirectly and/or directly, which in turn has an impact on the total breeding strategy of the species (see HENNIG 1994 and BÖRNER 1994). Populations can, to some extent, be indirectly manipulated by environmental changes, e.g. the shortage of grasslands, the destruction of nesting trees and the pollution of the environment (GLUTZ VON BLOTZHEIM 1962, HAARTMAN et al. 1969, SCHMIDT 1988, BÖRNER 1994, HAMARI et al. 1995).

The status of protection for the Jackdaw has mainly been determined on the basis of damages and benefits listed above. The available data seems to imply that in this century

Jackdaws in Finland have been "positioned on the fence". In 1962 the Jackdaw definitely fell on the unprotected side as a harmful species, and in 1898 and 1993 it was found not harmful and was protected. Non-protection legalized the active killing of Jackdaws, the closing of nest-holes and the chasing of the colonies away from at least 20 churches. The legitimized unprotection in 1962 triggered a decline period for Jackdaw populations in Finland. In the field work in the 1960's this trend was clearly observed, even though Atlas Data (1997) suspiciously presents as many as 17,000 breeding pairs. The estimation of MERIKALLIO (1958) was significantly lower, 8,000 pairs. Church evictions, the closings of other colonies and the killing of Jackdaws evidently taxed the reproductive age groups of the Jackdaws and lowered natality (see ANTIKAINEN 1978, cf. BRANDER 1958). Right in the 1960's many churches went through restoration processes, which besides other evictions decreased available nest-sites (ANTIKAINEN 1968). HAARTMAN et al. (1969) report a "sharp decline" in 1952-67 in the Tavastland region due to rapid destruction of aspens used as nest-holes by Black Woodpeckers (*Dryocopus martius*) and Jackdaws (cf. LINKOLA 1956, FOLK 1968, ANTIKAINEN 1978, UNGER 1994). As stated by many authors the availability of nest-holes strongly regulates the colonies/populations (e.g. PETER 1994, VOGEL-BAUMANN 1994). The shortage of accessible nest-holes probably increased pressure toward exceptional nest-sites (ANTIKAINEN 1975). In N the mean value of church colony size decreased from 9.8 to 7.7 breeding pairs. Evidently based on the quantitative data from the turn of the 1970's HILDÉN (1985) categorized the Jackdaw as a declining species, a fact caused by profound environmental changes in the country or/and on the wintering grounds.

However, the decline of the Jackdaw population in the 1960's was not linear everywhere. There is clear evidence in this study of mine and other reports that Jackdaws have adopted a very dynamic and flexible breeding strategy (HOLYOAK 1967, FOLK 1970,

ANTIKAINEN 1993 a). After unsuccessful breeding or non-access to one colony site, Jackdaws effectively find out new holes in the nearest vicinity or immigrate to other localities establishing a new colony there. If colonial breeding is not possible, young couples which have reached maturity also accept solitary breeding sites kilometers away e.g. in tree holes. This scattered breeding may also function as a primary colony (cf. ANTIKAINEN 1980 and SCHMIDT & SCHMIDT 1994). The strategy explains sporadic breeding and separate colonies especially in E, N, NE-Finland as well as in Lapland with varying, but generally low, densities. Expansion of distribution may work through these tactics (cf. e.g. LACK 1966).

From the end of the 1960's and from the beginning of the 1970's the status of the Jackdaw started to improve drastically: This positive trend even seemed to accelerate at the turn of the 1980's and the 1990's when the process toward re-protection of the species had been started. The mean colony size in churches increased, and bird rooms (Lohja) and nesting cells (Laitila, Juva) were constructed in church attics to minimize damage (ANTIKAINEN 1968, 1981 and PULKKINEN & POUTANEN 1986). It is obviously due to the flexible strategy of population dynamics discussed above that the Atlas squares with breeding records increased 34.2 % by the end of the 1980's. The map of squares were denser not only in S, but also in the population 2 and in 3, but less in 4. Simultaneously with the tripling of the total breeding pairs up to 50,000, the mean colony size of the chimneys in both S and N have increased. Also nest-box breeding has increased in S and N while the sizes of church colonies in N have decreased. This indicates the over-all trend in the country: The Jackdaw colonies have expanded to breed in chimneys and nest-boxes meant for the Goldeneye (*Bucephala clangula*) and for owls. Owing to electric heating being more common in houses there are unused chimneys available for Jackdaws. In addition, enforced bird ringing activity is conducive to setting up nest-boxes.

The remarkable expansion of the population 3 south as well as north along the coast of Northbothnia and along the Oulu river-side might be connected with the population dynamics as pointed out by HIRVELÄ & KOIVULA (1986). In boxes BS is at the level of those in S (i.e. 2.65 flying young/nest). The ecological factors (see HIRVELÄ & KOIVULA 1986) are here more beneficial than e.g. in E (cf. ANTIKAINEN 1978). The region is typical dairy-farmland rich in insects and seeds. For feeding Jackdaws particularly favor horse farms and ca. 15 communal refuse pits (LINDGREN 1997, oral information), which also attract wintering flocks. Climatic conditions are also more favourable here than in the innerland of E. The mean snow cover is 20 centimeters thinner (50/70 cm, KORHONEN 1958) and the period of snow cover on an average 28 days shorter (187/215, SOLANTIE et al. 1996). Inversely, the more severe climatic conditions in continental areas like Lapland restrict the distribution so that the northern margin from the line Ii-Paltamo-Sotkamo has not extended further north. In East Carelia the Jackdaw has spread up to 65° Nlat on the marine coast of the White Sea (KIVIRIKKO 1926, ZIMIN & IVANTER 1974).

The sample of the local colonies shows the annual fluctuation typical of the Jackdaw (e.g. HAARTMAN et al. 1969, SCHMIDT & SCHMIDT 1994 and VÄISÄNEN et al. Atlas Data 1997). Despite of the fluctuations the total trend of the whole Finnish population has increased from 17.000 (from the 1970's) to 29.000 pairs. According to Atlas Data (1997) the estimation approximates 71.000 pair at the end of the 1980's. Nevertheless, this number might be erroneous, because by using the TLC-methods colonies may not hit the census line very frequently. However, since the 1970's censuses were carried through the downtown areas more frequently, which may explain the high number. VÄISÄNEN et al. (Atlas Data) suggest that the number of breeding pairs could be merely ca. 50.000 pairs instead of 71.000. The estimation published by KOSKIMIES (1993) is 40.000–60.000 (cf. ANTIKAINEN 1994a).

In any case, since the 1980's the Atlas Index seems to confirm the species-specific success of the Jackdaw in Finland: the long-term fluctuation graph mostly indicates values over 100. So it does also in Denmark and Sweden (VÄISÄNEN et al, Atlas data 1997, cf. PETER & STEIDEL 1990).

Finally it can be summarized that the unprotection and protection phases have indisputably affected the population dynamics of the Jackdaw. The last few protective actions have placed the species in the category of success in Finland and have stabilized its intermediate position in the K-r-strategy continuum (cf. MAY 1976 and 1977).

Acknowledgements

I am grateful to Dr. RISTO A. VÄISÄNEN, Department of Zoology, University of Helsinki for providing me Atlas Data and for other valuable advice. Dr. KARI KOIVULA, Assoc. Professor and EERO LINDGREN, conservator, Department of Zoology, University of Oulu, distributed me valuable information on the population dynamics from Northbothnia, I want to thank you. Warm thanks also to PENTTI KOPPINEN for the graphics, Dr. MATTI OSARA, Ministry of Environment for sending me report on the protection status of the Jackdaw and to my wife, RITVA ANTIKAINEN, MA, for checking the English text.

Summary

In the course of 100 years the status of protection for the Jackdaw changed five times. The most significant change in the law of nature protection took place in 1962, when on the basis of damages caused by Jackdaw colonies for man, the species was removed from the list of protected animals. The effects of the withdrawal of protection on the population dynamics are measured in this study through a nationwide survey, my personal field studies in the 1960's 70's and 90's, local studies by other ornithologists (totally 774 colonies and 4841 breeding pairs) and the nationwide Atlas Census Data (1997). The Jackdaws were completely evicted from 17 % of churches (n=119) they ever

inhabited: 58 % moved into chimneys, 30 % into tree holes, and 12 % to other churches and buildings. It is indicative that there was a total decrease in the long-term breeding fluctuation index (Atlas Census) and the proportion of the nest-sites in churches and castles was lower i.e. 27.7 % in ANTIKAINENS (1978) study than later in this study i.e. 34.1 %. The lowest breeding estimations ranged from 8.000 to 17.000 pairs. As a result of enforced positive information on the species and nature protection in general by the media in the 1970's and 1980's in Finland, as well as the flexible population dynamics strategy by the Jackdaws, the total population increased to 71.000 pairs in 1986–89 (Atlas Census, discussed in paper). Especially the availability of nest-holes in boxes (meant for Goldeneye, *Bucephala clangula*, and owls) and in chimneys (owing to more common electric heating in houses) has provided the Jackdaws with nest-sites and opportunities to expand their populations considerably in the area of Oulu, Oulu-River-Valley and along the coast of the Gulf of Bothnia from Vaasa up to Ii (average size of colonies in chimneys increasing in the North from 3.1 to 6.8; new colonies being established in tree holes with average size of 3.5 pairs), and occasionally to Kemi-Tornio, even though the colonies in the North are more scattered but carry higher breeding success than in the East (HIRVELÄ & KOIVULA 1986). Since the start of the Jackdaw protection process in 1987 and its final completion in 1993, the populations in the South as well as in the North-West have been reinforced. There has been an increase of 34.2 % in the total number of Atlas squares (10 x 10 kilometers with categories breeding confirmed, breeding probable and breeding possible). The effects of protection/nonprotection are discussed on the basis of sizes of colonies, general breeding strategy and success combined with ecological factors.

Zusammenfassung

Auswirkungen des Schutzes der Dohle (*Corvus monedula*) in Finnland auf ihren Bestand

Im Verlaufe von 100 Jahren änderte sich der Schutzstatus der Dohle fünfmal. Die wichtigste Änderung im Naturschutzgesetz erfolgte 1962, als auf der Grundlage von Schäden, die durch die Dohle verursacht wurden, die Art von der Liste der geschützten Tiere gestrichen wurde.

Die Folgen sind Gegenstand dieser Studie. Sie basiert auf einer landesweiten Erfassung, meinen persönlichen Studien der 1960er, 1970er und 1990er Jahre, örtlichen Studien anderer Ornithologen und der landesweiten Brutvogelkartierung (Atlas Census) von 1997. Die Dohlen wurden aus den Kirchen (n = 119), die sie besiedelten, bis zu 17 % vertrieben. 58 % siedelten in Schornsteine, 30 % in Baumhöhlen und 12 % in andere Kirchen und Gebäude um. Gemäß dem „Atlas Census“ gab es einen Gesamtrückgang des „Langzeit-Brutfluktuations-Index“, und der Anteil von Brutplätzen in Kirchen und Schlössern stieg von 27,7 % (z. B. ANTIKAINEN 1978) auf 34,1 % (diese Studie). Die niedrigsten Brutpaarzahlen werden mit 8.000–17.000 Paaren angegeben. Im Ergebnis einer zunehmend positiven Einstellung zu dieser Art und zum Naturschutz im allgemeinen stieg der Bestand im Zeitraum von 1986–1989 auf 71.000 Paare an (Atlas Census).

Durch zusätzliche Nistmöglichkeiten in für Schellenten und Eulen angebrachten Nistkästen und in Schornsteinen, die dank der zunehmenden elektrischen Beheizung der Häuser verfügbar wurden, konnten die Dohlen im Gebiet um Oulu, im Oulu-Tal und entlang des Bottnischen Meerbusens von Vaasa bis Li ihren Bestand beträchtlich vergrößern und ausdehnen. Die Durchschnittsgröße der Kolonien in Schornsteinen stieg im Norden von 3,1 auf 6,8. Die neuen Kolonien in Baumhöhlen haben eine Durchschnittsgröße von 3,5 Paaren. Gelegentlich erstrecken sich die Brutkolonien bis Kemi-Tornio. Obwohl die Kolonien im Norden mehr zerstreut sind, haben sie dennoch einen höheren Bruterfolg als im Osten (HIRVELÄ & KOIVULA 1986).

Seit dem Beginn des Dohlenschutzes 1987 und dem Abschluß dieser Arbeit 1993 haben sich die Bestände sowohl im Süden als auch im Nordwesten des Landes vergrößert. Die Zahl der Atlas-Quadranten von 10 x 10 km mit den Kategorien „Brut bestätigt“, „Brut wahrscheinlich“ und „Brut möglich“ erhöhte sich um 34,2 %. Die Ergebnisse des Dohlenschutzes bzw. eines mangelnden Schutzes werden auf der Grundlage der Größe der Kolonien, der allgemeinen Brutstrategie der Art und ihrem Bruterfolg in Verbindung mit den ökologischen Faktoren diskutiert.

5 References

- ANTIKAINEN, E. (1968): Naakan suosittuudesta kirkoissamme. – Suomen Luonto 27, 115–119.
- ANTIKAINEN, E. (1970a): Naakan pesimäaikaisesta käyttäytymisestä. – Luonnon Tutkija 74, 50–58.
- ANTIKAINEN, E. (1970b): Naakan esiintymisestä Savossa. – Savon Luonto 2, 20–24.
- ANTIKAINEN, E. (1975): Exceptional nest sites of the Jackdaw. – Lintumies 10, 16–19 (finn.; summary).
- ANTIKAINEN, E. (1978): Breeding adaption of the Jackdaw *Corvus monedula* L. in Finland. – Savonia 2, 1–45.
- ANTIKAINEN, E. (1980): Iisalmen naakkapopulaatio ja sen strategia. – Lintumies 15, 98–101.
- ANTIKAINEN, E. (1981): The breeding success of the Jackdaw *Corvus monedula* in nesting cells. – Ornis Fennica 58, 72–77.
- ANTIKAINEN, E. (1983): Naakka. – In: HYYTIÄ, K., E. KELLOMÄKI & J. KOISTINEN (eds.): Suomen Lintuatalas. – Helsinki, pp. 420–421.
- ANTIKAINEN, E. (1994a): Naakat nousuun. Summary: The status of jackdaws. – Suomen Luonto 53, 24–26, 58.
- ANTIKAINEN, E. (1994b): The ecology and breeding adaption of the Jackdaw in Finland. – Naturschutzreport 7, 268–279.
- BÖRNER, J. (1994): Maßnahmen zum Schutz der Dohle (*Corvus monedula*) im Raum Chemnitz. – Die Entwicklung einer Baumbrüterkolonie von 1988 bis 1993. – Naturschutzreport 7, 355–358.
- BRANDER, T. (1953): Lounais-Hämeen luonnosta. – Kotiseutukuvauksia Lounais-Hämeestä 32, 38–51.
- BRANDER, T. (1958): Kielteisiä kokemuksia naakan rauhoituksesta Lounais-Suomessa. – Suomen Riista 11, 100–109.
- BRANDER, T. (1970): Differential breeding in *Corvus monedula*, *Sturnus vulgaris*, *Parus major* and *Fringilla coelebs* in woodland and non woodland habitats. – Zool. Listy 19, 261–273.
- DWENGER, R. (1989): Die Dohle. – Neue Brehm-Büch. 588. Wittenberg Lutherstadt.
- FOLK, C. (1968): Das Nisten und die Populationsdynamik der Dohle (*Corvus monedula*) in der ČSSR. – Zool. Listy 17, 221–236.
- GLUTZ VON BLOTZHEIM, U. N. (1962): Die Brutvögel der Schweiz. – Aarau.
- HAARTMAN, L. VON, O. HILDÉN, P. LINKOLA, P. SUOMALAINEN & R. TENOVUO (1969): Pohjo-lan linnut värikuvien. – Vihko 9, 689–695.
- HAMARI, R., H. MUSSALO-RAUHAMAA & J. UOTILA (1995): Ympäristö ja ihminen. – Porvoo.
- HENNIG, S. (1994): Aktivitätsmuster und Raumnutzung der Dohle (*Corvus monedula* L.) in der Umgebung der Kolonie Jena-Göschwitz während des Winterhalbjahres. – Naturschutzreport 7, 297–304.
- HILDÉN, O. (1985): Long-term trends in the Finnish bird fauna: methods of study and some results. – Lintumies 20, 207–217 (finn.; summary).
- HIRVELÄ, J. & K. KOIVULA (1986): Naakan (*Corvus monedula*) pönttöpesinnästä ja pesimäbiologiasta. – Aureola 11, 34–63.
- HYYTIÄ, K., E. KELLOMÄKI & J. KOISTINEN (1983; eds.): Suomen Lintuatalas. – Helsinki.
- JÄRVINEN, O. & R. VÄISÄNEN (1973): Species diversity of Finnish birds, I: Zoogeographical zonation based on land birds (Suomenkielinen selostus). – Ornis Fennica 50, 93–125.
- JÄRVINEN, O. & R. VÄISÄNEN (1977): Suomen pesimälinnusto: tiheydet ja kannanmuutokset. – Ornis fennica 54, 30–34.
- KIRKKOMÄKI, T. (1990): Faunistinen katsaus vuoden 1988 linnustoon Pohjois-Pohjanmaalla. – Lintumies 15, 102–154.
- KIVIRIKKO, K. E. (1926): Suomen Linnut , osa 1. – Porvoo.
- KORHONEN, V. (1958): Lumi- ja jääsuhteet. – Oma maa 1, 132–146.
- KOSKIMIES, P. (1993): Suomessa pesii 50 miljoonaa lintuparia. – Linnut 2, 6–15.
- LACK, D. (1966): Population studies of birds. – Oxford.
- LIEBERS, D. (1994): Die Einehe der Dohlen – Oder gibt es doch Seitensprünge? – Naturschutzreport 7, 347–354.
- LÜTKEPOHL, M. (1994): Beobachtungen an baumbrütenden Dohlen im Naturschutzgebiet „Lüneburger Heide“ und Schlußfolgerungen für den Schutz. – Naturschutzreport 7, 317–324.
- MAY, R. M. (1976): Theoretical Ecology. Principles and Applications. – Oxford, London, Edinburgh, Melbourne.
- MAY, R. M. (1977): Optimal life-history strategies. – Nature 267, 394–395.
- MERIKALLIO, E. (1946): Über regionale Verbreitung und Anzahl der Landvögel in Süd- und Mittelfinnland, besonders in deren östlichen Teilen im Lichte von quantitativen Untersuchungen I–II. – Ann. Zool. Soc. Zool. Bot. Fenn. Vanamo 12, No. 1–2.
- MERIKALLIO, E. (1958): Finnish birds. Their Distribution and Numbers. – Fauna Fenn. 5.
- PETER, H.-U. (1992): Untersuchungen zur Ökologie der Dohle (*Corvus monedula*) als Voraussetzung für einen gezielten Schutz. – Ökologie u. Naturschutz 1, 2.
- PETER, H.-U. (1994): Zur Brut- und Populationsbiologie der Dohlen (*Corvus monedula* L.) der Kolonie Jena-Göschwitz. – Naturschutzreport 7, 281–290.

- PETER, H.-U. & G. STEIDEL (1990): Long term population studies in Jackdaws. – Acta XX Congressus Internationalis Ornithologici Christchurch/New Zealand, Suppl., 384–385.
- PULKKINEN, M. & J. POUTANEN (1986): Kirkkomiljö perinteiseksi. Juvan kirkon ullakko naakkojen „rivitaloksi“. – Savon Sanomat 27.4.1986.
- ROELL, A. (1978): Social behaviour of the Jackdaw, *Corvus monedula*, in relation to its niche. – Behaviour 64, 1–122.
- SALMELA, T. (1995): Faunistinen katsaus. – Tringa 4, 214.
- SCHMIDT, K. & M. SCHMIDT (1994): Zum Vorkommen und zur Brutbiologie der Dohle (*Corvus monedula*) in Südthüringen. – Naturschutzreport 7, 326–336.
- SHARROCK, J. T. R. (1980): The progress of breeding bird atlas projects in Europe. – Göttingen.
- SOLANTIE, R., A. DREBS, E. HELLSTEN & P. SAURIO (1996): Lumipeitteentulo-, lähtö- ja kestoajoista Suomessa talvina 1960/61–1992/93. – Finnish Meteorological Institute, Helsinki, pp. 1–159.
- UNGER, C. (1994): Zum Vorkommen und Schutz der Dohle in Süd-Sachsen-Anhalt. – Naturschutzreport 7, 344–346.
- TENOVOO, R. (1967): Zur Urbanisierung der Vögel in Finnland. – Ann. Zool. Fenn. 47, 159–166.
- TORNBERG, R. (1997): Prey selection of the Goshawk *Accipiter gentilis* during the breeding season: The role of prey profitability and vulnerability. – Ornis Fennica 74, 15–28.
- VOGEL-BAUMANN, C. (1994): Die Dohle in der Schweiz. Bestand, Gefährdung, Förderung. – Naturschutzreport 7, 311.
- VUORISALO, T. & J. TIAINEN (1993): Kaupungin linnut, stadens fåglar. – Turku.
- VÄISÄNEN, R. A. (1985): Suomen pesivän maalinuston yleiskehitys 1978–84 ja tila 1984. – Lintumies 19, 134–153.
- VÄISÄNEN, R. A., E. LAMMI & P. KOSKIMIES (1997): Lintuatlas 1997: Naakka. – Manuscript, Dept. of Zool. Univ. of Helsinki.
- VÄISÄNEN, R. A., E. LAMMI & P. KOSKIMIES (1998): Muuttura pesimä-linnusto. – Helsinki.
- ZIMIN, V. B. & E. V. IVANTER (1974): Zivopitnii mir Karelii. Ptitsi. – Petrozavodsk.
- ZIMMERMANN, D. (1951): Zur Brutbiologie der Dohle (*Coloeus monedula* L.). – Ornithol. Beob. 48, 73–111.

EERO ANTIKAINEN, Suistamonkatu 86,
SF-74120 Iisalmi, Finland

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Mitteilungen des Vereins Sächsischer Ornithologen](#)

Jahr/Year: 1999

Band/Volume: [8_SH_2](#)

Autor(en)/Author(s): Antikainen Eero

Artikel/Article: [Effects of protection on the population dynamics of the Jackdaw \(*Corvus monedula*\) in Finland 9-20](#)