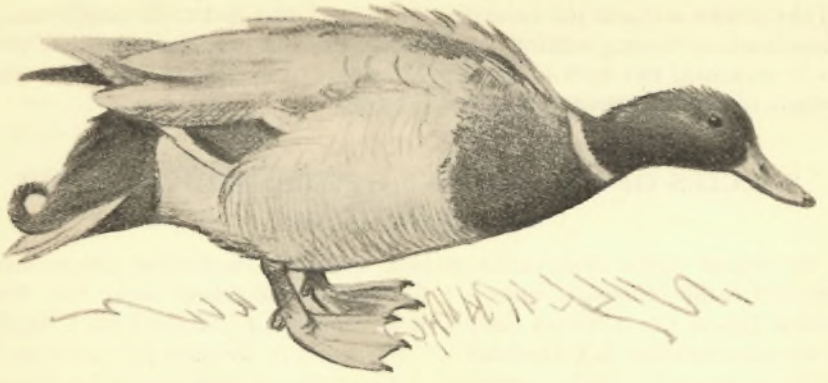

WILDFOWL RESEARCH IN RUSSIA

Biological Foundations for the Regulation of Wildfowling in the Central Districts of the European Part of the U.S.S.R.

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This paper was originally published in Russian in the (*Moscow*) Zoological Journal, *Volume* 35, *Part* 1, *pp.* 77–88 (1956). *A copy was made available to us by Professor G. P. Dementiev of the Moscow State University. It says so much about Russian attitudes towards wildfowl, wildfowling and wildfowl research, as well as providing important factual data, that it seems well worth reprinting at length. Mr D. D. Harber undertook the translation, for which we are most grateful. A few editorial changes have been made, with the objects of improving the layout of the tables and of removing some repetitions in the text, but no significant omission or additions have been made.*

INTRODUCTION

THE material for the present work was collected during 1953 and 1954 on the territory of the Oka State Sanctuary and in the adjacent shooting areas. The following were covered by our observations: the flood-lands of the River Oka within the limits of the Uzhevski and Yerakhturski regions of the Ryazan district, the flood-lands of the River Pra on its lower course (approximately 40 kilometres from its mouth), and a series of lakes outside the flooded areas and situated in the Oka Sanctuary (Yerus, Ukhanskoie, Tatarskoie, Kalnoie, Svatoie-Poluninskoie, etc.).

As a result of the work which was performed, we had at our disposal records of encounters with more than 32,000 waterfowl, information as to the species of 356 birds obtained by hunters and the results of the laboratory examination of 210 ducks. Besides this, over a period of years, over 700 ducks had been caught alive in the Sanctuary and ringed, and information about some of these was also utilised in our work.

In addition, all the material relating to duck ringing concentrated in the Ringing Bureau of the Chief Administration of Sanctuaries and Hunting Economy of the Ministry of Agriculture of the U.S.S.R. was examined and made use of where possible.

Taking into account the similarity of natural and historical conditions and the methods of hunting wildfowl, we consider that our proposals and conclusions can be extended not only to the Ryazan district but also to all other central districts of the European part of the U.S.S.R.

SPECIES OF WATERFOWL OF THE REGION OF THE OKA SANCTUARY

In the region under observation sixteen species of waterfowl are recorded: Whooper Swan (*Cygnus cygnus* L.), Greylag Goose (*Anser anser* L.), White-fronted Goose (*A. albifrons* Scop.), Bean Goose (*A. fabalis* Lath.), Mallard (*Anas platyrhynchos* L.), Gadwall (*A. strepera* L.), Wigeon (*A. penelope* L.), Pintail (*A. acuta* L.), Teal (*A. crecca* L.), Garganey (*A. querquedula* L.), Shoveler (*A. clypeata* L.), Goldeneye (*Bucephala clangula* L.), Pochard (*Aythya fernia* L.), Tufted Duck (*Aythya fuligula* L.), Scaup (*Aythya marila* L.), and Smew (*Mergus albellus* L.).

Of the species named, only seven—the ducks of the genus *Anas* (excluding the Wigeon) and the Pochard—nest with us annually.

The relative numbers of the species of wildfowl observed and obtained by local wildfowlers at different seasons are shown in Table I.

TABLE I

Relative Numbers of Wildfowl Seen and Shot in the Region of the Oka Sanctuary at Different Seasons

Percentages of Total Population

Species	Sight Records			Obtained by Hunters	
	Spring 1 April to 10 May (14,900 birds in all)	Summer 1 June to 31 July (3250 birds in all)	Autumn 15 Aug. to 1 Nov. (14,100 birds in all)	Spring (183 birds in all)	Autumn (173 birds in all)
Mallard	7·2	50·1	79·3	65·0	68·2
Teal	2·0	13·2	6·8	10·9	13·8
Garganey	5·9	29·5	3·1	16·4	13·3
Pintail	1·1	2·8	0·4	1·6	0·6
Shoveler	0·3	2·8	0·4	0·6	—
Gadwall	0·2	0·9	0·6	2·2	1·7
Wigeon	22·4	—	0·6	0·6	0·6
Tufted Duck	0·6	0·2	1·6	—	1·2
Scaup	0·3	—	—	—	—
Pochard	1·3	0·5	0·3	—	0·6
Goldeneye	0·2	—	0·8	—	—
Smew	0·1	—	0·1	—	—
White-fronted Goose	48·2*	—	—	2·7	—
Greylag and Bean Geese	10·1	—	—	—	—
Whooper Swan	0·1	—	—	—	—

* *Many of these geese would almost certainly have spent the winter at Slimbridge, for recoveries of Trust-ringed Whitefronts include several from Ryazan.*—EDITORS.

Some idea of the numbers of wildfowl at different times of the year is given by Table II.

TABLE II

Relative Abundance of Wildfowl Seen in the Oka Sanctuary Region

Species	Maximum number of individuals encountered in a day in the period of:		
	Spring Passage	Nesting and Moult	Autumn Passage
Mallard	40	150	1000
Teal	15	100	200
Garganey	120	100	200
Pintail	50	20	50
Shoveler	14	20	50
Gadwall	10	20	50
Wigeon	1300	—	60
Tufted Duck	50	1	150
Scaup	40	—	—
Pochard	70	20	50
Goldeneye	13	—	70
Smew	2	—	5
White-fronted Goose	1000	—	?
Greylag and Bean Geese	200	—	150
Whooper Swan	7	—	—

In spring in our region Wigeon and geese are the most numerous species; they amount to 80% of all wildfowl encountered. At this season Mallard, Teal and Garganey predominate amongst birds obtained by wildfowlers, and form more than 90% of the total number of birds killed. Mallard, Teal and Garganey also predominate during the nesting and moulting period; during this time they amount to almost 93% of the wildfowl recorded. During the period of autumn passage the Mallard is most often encountered (79·3% of the total records). This same species occupies first place among duck obtained by wildfowlers in autumn (68·2%). A characteristic feature of the wildfowl fauna of the region of the Oka Sanctuary at all seasons is the marked preponderance of vegetarian and omnivorous species over those eating animal matter, which is, in all probability, due mainly to the lack of transparency of the water and partly to its relative poorness in animal foods.

HUNTING WILDFOWL

Periods and Methods

In our region wildfowl are shot both in spring and in autumn. In spring, shooting is usually permitted from the time of the arrival of the duck (i.e. from the beginning of April) and continues up to 2–5 May, for more than thirty days. It is permitted in spring to obtain the drakes of all species and also geese on passage. The most general method of obtaining wildfowl in spring is the shooting of Mallard drakes which go to a decoy duck. Shooting geese by lying in wait for their evening and morning flights is less widespread. The remaining

species of wildfowl are very rarely obtained in spring and mainly at the same time as drake Mallard. Obtaining Wigeon and diving duck by the use of decoys (dummies) is not practised.

Autumn shooting of wildfowl is usually allowed with us from 1 August (only in 1954 was it changed to 15 August) and it continues up to the departure of the birds, i.e. until the beginning or sometimes the second half of November—for 92 to 107 days.

In autumn almost exclusively surface-feeding ducks are obtained with us (Table I); in August mainly by shooting at broods and in the remaining autumn months mainly by shooting during the evening and morning flights.

Duck occupy the main place among game shot by local shooters. At the present time cases are not rare where a single fowler obtains 15–25 drakes in spring and 50 or more individuals in autumn.

In the regions surrounding the Oka Sanctuary there are no game reserves. Their function is fulfilled by the territory of the Sanctuary in which considerable numbers of duck, reaching several thousand individuals, nest and in autumn spend the day. Thus, for example, in Markino Bog, with an area of about 50 hectares (about 124 acres), 40–50 broods of various duck species are to be found in favourable years; on Lake Pilki, with an area of about 2 hectares (5 acres), up to 500 Mallard spend the day in the second half of August and in September, and on Lake Yerus, with an area of 30 hectares (74 acres), more than 1000 duck not infrequently assemble in September and October. Taking into account the fact that the total area of the lakes of the Oka Sanctuary amounts to 350 hectares (865 acres), and that of the bogs to 3000 hectares (7400 acres, or $1\frac{1}{8}$ square miles), we must conclude that the Sanctuary exercises without doubt a very positive influence on the preservation of stocks of wildfowl in the adjacent hunting territories.

Justification of the Measures immediately necessary in order properly to Regulate Hunting

We consider it possible to allow spring shooting under the overriding condition that its times and methods should be brought into conformity with the interests of protecting and increasing game. Spring shooting must be carried on with the object of causing the minimum losses to nesting birds.

The Mallard must be considered the main species of wildfowl nesting abundantly in our region. This same species, as we have seen, is also predominant among the wildfowl obtained by shooting in spring.

The Mallard arrives early with us—at the end of March or the beginning of April. The average date of encountering the first Mallard over seventeen years is 1 April; the extreme dates are 13 March and 13 April. The local ducks which have already split up into pairs on their wintering grounds are the first to arrive. During the first ten to fifteen days after arrival, the Mallard pairs remain inseparable and not infrequently come down near the decoy ducks. Later, with the beginning of egg laying, the pairs separate during a considerable part of each twenty-four hours, and it is almost exclusively the drakes which approach the decoy ducks. At this same time (from about the end of the second ten days of April) a number of drakes without mates appear in the area. It can be supposed that these are birds which have not found a mate on the wintering grounds and which have arrived after the mated birds. The number of such 'bachelor' drakes with us is rather larger than that of the nesting pairs and, in distinction from these, they lead a nomadic life. Thus, for example, at Ageieva

Gora, in an area of about four square kilometres, the staff of the Sanctuary shot 18 Mallard drakes in the spring of 1953 and 24 in that of 1954. After this shooting the number of drakes in this area had not noticeably decreased, and they flew up to the decoy ducks no less frequently than at the beginning. This can be explained only by a continual arrival of 'bachelor' drakes. However, the problem of the status of this group of drakes can only be finally solved by ringing them.

The attitude of the wild Mallard, and also other species of duck, to the decoy ducks at different periods in spring is shown in Table III, which has been compiled on the basis of our observations during 73 experimental shoots in the spring of 1954.

TABLE III

Seasonal Changes in the response of Males and Females to Decoy Ducks

	Five-day Periods in April					Five-day Periods in May		
	6–10	11–15	16–20	21–25	26–30	1–5	6–10	11–15
Percentage of females among Mallard coming to a decoy duck	43·0	40·0	13·0	0	10·0	0	0	0
Number of drake Mallard coming to a decoy duck during 10 hours of hunting	5·5	3·2	5·7	8·6	9·5	6·7	7·2	12·7
The same for drakes of other species	0	0·7	0·7	0	0·4	2·9	7·7	18·2
The duration of experimental hunting in hours	23·5	28·0	47·5	10·5	28·5	10·5	19·5	5·5
Total number of Mallard coming to a decoy duck during all hunts	23	15	31	9	30	7	14	7
The same for other species of duck ..	—	3	5	—	2	6	26	15

Mallard drakes approach decoy ducks with particular intensity from the third ten days of April. Mallard females from this period and up to the end of the first half of May scarcely approach decoy ducks at all. Thus, out of 67 Mallard approaching decoy ducks during this period, only 3 (i.e. 4·5%) were females. We see a completely different picture during the first two ten-day periods of April. Mallard females very frequently approach a decoy duck at this time. Out of 69 Mallard approaching a decoy during this period, 20 (i.e. 29%) were females. From the second half of May the drake Mallards begin to assemble in flocks before their departure to their summer moulting places; a certain number remain for the moulting period in the region of the Oka Sanctuary.

The fact that female Mallard are very vulnerable to wildfowlers at the beginning of April is confirmed by the ratios among ringed duck obtained in spring in the central zone of the European part of the U.S.S.R. (Table IV).

The females of the remaining species of surface-feeding ducks are obtained in spring twice as frequently as those of the Mallard, due obviously to shooting at flocks on passage. It is necessary to bear in mind that the relative number of females among duck obtained in spring given in Table IV is very probably too low, owing to the fact that wildfowlers conceal some of the rings taken from females, the killing of which is forbidden everywhere in spring, and also because males predominate among the ducks which are ringed (this subject is treated in more detail below).

TABLE IV

Number and Sex of Ringed Ducks killed in Spring in the Central Zone of the European part of the U.S.S.R.

Species	April						May					
	1–10			11–20			21–30			1–10		
	M.	F.	%F.	M.	F.	%F.	M.	F.	%F.	M.	F.	%F.
Mallard	10	3	23	35	1	3	36	1	3	28	2	7
Other dabbling ducks: Pintail, Teal, Garganey, Gadwall, Wigeon, Shoveler	19	3	14	49	5	9	52	10	16	44	7	13

On the basis of what has been said above, the most acceptable time for shooting Mallard in spring under our conditions may be regarded as the period from 20 April to 10 May. This period is also suitable from the point of view of the proper organisation of shooting other species of surface-feeding ducks.

The latter conclusion is based upon changes in the relative numbers of the species of wildfowl during different periods of spring in the region of the Oka Sanctuary (Table V). The numbers of birds of each species are shown in the table as percentages of the total number of all individuals recorded during the given ten-day period.

TABLE V

Changes in the Relative Abundance of different Species in the Oka Sanctuary Region in Spring

Name of Species	April Ten-day Periods			May		
	1–10	11–20	21–30	1–10	11–20	21–30
Mallard	62·6	30·1	3·4	2·9	30·0	22·3
Teal	—	7·6	2·3	2·3	13·7	4·5
Garganey	—	8·7	7·0	4·6	18·0	61·7
Shoveler	—	1·7	0·6	0·2	7·3	5·5
Pintail	23·4	1·5	0·8	0·3	1·4	2·8
Gadwall	—	—	0·1	—	—	0·6
Wigeon	11·0	8·5	15·1	36·1	8·6	—
Goldeneye	3·0	—	0·1	0·1	—	0·9
Pochard	—	—	0·5	2·0	1·0	1·4
Smew	—	—	0·1	—	—	—
Greylag and Bean Geese ..	—	21·6	1·2	0·1	—	—
White-fronted Goose	—	20·3	63·8	51·4	20·0	0·3
Total number of birds involved*	137	427	4100	5500	235	640

* In 1954, when we collected material for Table V, the Tufted Duck, Scaup and Whooper Swan were not recorded at all on spring passage in the region of the Oka Sanctuary.

The main mass of migratory wildfowl (Wigeon, diving duck and geese) passes through our region during the third ten days of April and the first ten

days of May. Wigeon and White-fronted Geese stay in considerable numbers on those parts of the meadows which have emerged from the water and live there until the middle of May. The termination of spring shooting on 2–5 May, as is the case at present, in practice excludes these abundant species as objects of spring shooting. The same may be said about the diving ducks, which are, it is true, relatively few in number in our region.

The numbers of wildfowl in the period of spring passage are shown in Table VI, based on observations in 1953 and 1954.

TABLE VI

Numbers of Wildfowl seen in Spring in the Oka Sanctuary, 1953 and 1954

Year	Month and 10-day Period	No. of Hours of Observation	No. of Individuals recorded during 10 hours			
			Surface-feeding Duck	Diving Duck	Geese	All Water-fowl
1953	April 11–20	14	120	55	255	430
	21–30	11	350	100	315	765
	May 1–10	7	570	25	285	880
1954	April 1–10	5	140	10	—	150
	11–20	15	105	—	65	170
	21–30	25	430	10	1160	1600
	May 1–10	32	725	35	545	1305

The numbers of wildfowl during the first two ten-day periods of April are not large, and mostly consist of local nesting species (Mallard, Teal and Garganey) or of species passing through our locality without staying long (Greylag Goose, Bean Goose). In wildfowling during these first two ten-day periods of April, nearly all the birds killed are Mallard (Table VII).

TABLE VII

Numbers of Wildfowl killed in Spring in the Oka Sanctuary Region (1954?)

Species	Number of Birds Killed			
	April			May
	1–10	11–20	21–30	1–10
Mallard	17	36	51	15
Pintail	—	1	2	—
Shoveler	—	—	1	—
Gadwall	—	—	2	2
Wigeon	—	1	—	—
Teal	—	1	12	17
Garganey	—	1	8	11
White-fronted Goose ..	—	—	1	4
Total killed	17	40	77	49
Percentage of Mallard ..	100	90	66	31

If spring shooting were permitted from 20 April to 10 May, its effect on the local breeding population of duck would be considerably lessened, and it would be possible to include among its objects the gregarious northern species (Wigeon, White-fronted Geese and diving ducks) which at present are scarcely made use of with us.

The moving forward of the period of spring shooting to the last ten days of April and the first ten days of May would not result in a very great decrease in the total number of wildfowl killed in spring, since this is the period at which the central zone of the European part of the U.S.S.R. is most productive, as is seen from Table VIII, which records the numbers of ringed ducks recovered in this zone in spring.

TABLE VIII

Numbers of Ringed Ducks recovered in Spring in the Central Zone of the European part of the U.S.S.R.

Species	Number of Ringed Duck obtained in Central European Russia												Total	
	April						May							
	1–10		11–20		21–30		1–10		11–20		21–31			
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
Mallard ..	14	11·2	36	28·8	40	32·0	30	24·0	5	4·0	—	—	125	100
Teal	7	8·2	17	20·0	25	29·4	27	31·8	9	10·6	—	—	85	100
Garganey ..	1	2·4	8	19·5	14	34·2	15	36·6	1	2·4	2	4·9	41	100
Shoveler ..	—	—	2	22·2	2	22·2	4	44·5	1	11·1	—	—	9	100
Pintail ..	14	12·7	31	28·2	33	30·0	21	19·1	9	8·2	2	1·8	110	100
Gadwall ..	1	7·2	4	28·5	3	21·4	1	7·2	5	35·7	—	—	14	100
Wigeon ..	—	—	4	30·8	5	38·4	3	23·1	1	7·7	—	—	13	100
All Species ..	37	9·3	102	25·7	122	30·7	101	25·5	31	7·8	4	1·0	397	100

An essential condition for allowing spring shooting of wildfowl in the central districts of the European part of the U.S.S.R., in our opinion, is that it must retain a purely sporting character. Shooting in spring must not be linked with the mass killing of game. The number of birds obtained by fowlers at this season must be limited and must strictly correspond with the supplies of game in the shooting areas. This, of course, presupposes a considerable strengthening of the effective control of the appropriate organisations over spring shooting.

We consider the two prerequisites for allowing spring shooting of wildfowl to be: (*a*) the formation in every district of seasonal spring reserves, covering not less than a quarter of the territories occupied as nesting sites by duck, and (*b*) the carrying out of a mass shoot of the Hooded Crow in the shooting territories. This bird, as investigations in the Sanctuary have shown, destroys under the conditions prevailing with us large numbers of clutches of wild duck and other game birds. Every shooter who obtains permission to shoot in spring must have the task of destroying two or three pairs of crows.

A very important element in the preservation of wildfowl is the campaign against taking duck eggs, a practice which still occurs with us on occasion. The fines for destroying nests must be considerably increased, and the protection of

shooting territories, particularly meadows, improved. At the same time wide-spread, mass explanatory work must be carried on amongst shooters.

We will now proceed to deal with autumn shooting. We consider that its start should be fixed at a time when the absolute majority of the duck broods are able to fly. The usual date for the beginning of autumn shooting in our regions —1 August—does not correspond with this demand. During June and July in 1953 and 1954 117 broods of duck were recorded in the region of the Sanctuary, and notes were made of their numbers, approximate age and the stage of the plumage development of the ducklings. Using these data, we established the percentages of broods unable to fly for different species of duck by 1 August, the usual time for the beginning of autumn shooting (Table IX).

TABLE IX

Proportion of Broods of Ducks breeding in the Oka Sanctuary still unable to fly by 1 August

Name of Species	No. of Broods	Broods unable to fly by 1 August	
		No.	%
Mallard	56	15	27
Teal	27	8	30
Garganey	26	9	35
Pintail	3	2	67
Shoveler	3	2	67
Gadwall	2	1	50
All Species ..	117	37	32

At the beginning of August, among all species of duck, broods unable to fly formed 32%. Such broods were encountered most frequently among Garganey, Pintail, Shoveler and Gadwall, species which begin to nest later than the others—mainly on the banks of the lakes of the flooded areas which do not usually become free from spring flooding until the first half of May. In the cases of the Mallard and the Teal, which nest earlier and not infrequently in woodland, far from water, broods unable to fly were encountered more rarely at the beginning of August though the number of such broods was still quite large.

The later dates of the 'ripening' of broods of Garganey, Pintail, Shoveler and Pochard are well illustrated by the data for catching duck for ringing. In the Oka Sanctuary mainly young duck, not yet able to fly, are caught for ringing. Table X shows the relative numbers of different species of duck caught for ringing during the last ten days of July, and compares these with their relative numbers in nature, determined by mass counts in the nesting period.

Mallard and Teal are encountered among duck caught for ringing—i.e. among birds which are still unable to fly at the beginning of August—only half as frequently as they are met with among duck recorded during the nesting period. But Garganey, Pintail, Shoveler and Pochard are encountered more frequently amongst flightless birds caught than in the wild. One of the reasons for the rarity of these species as nesters with us can be considered to be the shooting of their broods before they are able to fly, as has undoubtedly taken place every year when shooting has been allowed from 1 August.

The data relating to the return of rings from duck (mainly adults) obtained

TABLE X

Number of Ducks caught for Ringing in the Oka Sanctuary in late July compared with the Numbers seen during the Nesting Period

Species	No. of Birds seen during the Nesting Period		No. of Birds caught for Ringing, 21–31 July	
	abs.	%	abs.	%
Mallard	1630	50	70	24
Teal	430	13	17	6
Garganey	960	30	120	42
Pintail	90	3	24	8
Shoveler	90	3	45	16
Pochard	15	1	12	4
All Species ..	3215	100	288	100

in the central zone of the European part of the U.S.S.R. also confirm that August shooting is most injurious to late-nesting species of wildfowl. Thus, for instance, among Pintail obtained in August the percentage of females is 69%, whereas in the case of the Mallard, which nests early, it is only 48% in this month. In September the females of both these species are obtained considerably less frequently—37% and 43% respectively. As has already been shown above, broods of flightless Pintails are encountered much more frequently in August than broods of Mallard. This is the reason why females of the former species are more frequently obtained: females with broods unable to fly are much easier game for hunters than females with broods already on the wing.

Taking into account the considerable number of duck unable to fly at the beginning of August, and also the fact that young duck beginning to fly use their wings unwillingly and are too confiding in relation to man for at least ten days after taking wing, we must regard it as necessary to shift the beginning of autumn shooting to the end of the second ten days of August.

If autumn shooting starts from 20 August the possibility of killing ducks unable to fly will be almost completely excluded, and there will be fewer adult females obtained while they are decoying dogs away from broods unable to fly and thus becoming the first to be shot by the fowlers. The autumn shooting of wildfowl should continue with us until the end of their mass stay here, i.e. until the end of October—for 70 days.

Besides putting in order the times for the autumn shooting of wildfowl, we consider the following to be among the steps which should immediately be taken in order to rationalise hunting: (*a*) the organisation of increased and effective protection of shooting territories during the period when duck are nesting, when with us cases of taking eggs and of duck unable to fly or in moult being caught by dogs are not infrequent, and (*b*) the formation of autumn shooting reserves embracing not less than a quarter of the flood-land territories. These reserves must be chosen so as to contain waters suitable for duck both to spend the day and to feed. The necessity of carrying into effect these two measures is obvious without special discussion. If shooting is allowed only during the period indicated and if reserves are organised, no limitation of the number of duck to be killed in autumn is in our opinion necessary.

CHANGES NECESSARY IN RINGING WATERFOWL

The practical value of marking and ringing animals in solving a number of questions connected with the rationalisation of their exploitation and as one of the methods of calculating the relative numbers of economically important species is obvious. The ringing of wildfowl has been carried on quite widely in the Soviet Union and has made it possible to elucidate a number of problems of their ecology, thus facilitating the organisation of wildfowling. For several species of duck we have learned in general outline the main directions of the seasonal migrations, the wintering grounds and some regions of mass moulting; for individuals of some species the constancy of nesting-places has been established and so on.

However, the relatively small number of birds ringed annually and the defects of the present distribution of the main ringing points make it impossible, as yet, to utilise the material obtained through ringing to a sufficient extent.

We will illustrate this with examples:

The number of ringed duck obtained should, theoretically, be proportionate to the total number of birds shot. An analysis of the material giving the numbers of ringed duck obtained in the European part of the U.S.S.R. (Table XI) shows that most are obtained in the southern zone (the shores of the Black Sea and the Sea of Azov and the adjacent regions, Transcaucasia, the shore of the

TABLE XI

Seasonal and Regional Distribution of Recoveries of Ringed Ducks in the European part of the U.S.S.R.

Month	European Part of the U.S.S.R.							
	Number of Ringed Duck obtained*							
	Southern Zone		Central Zone		Northern Zone		Total obtained in the European part of the U.S.S.R.	
	abs.	%	abs.	%	abs.	%	abs.	%
January ..	74	9·3	1	0·1	1	0·6	76	4·5
February ..	117	14·7	3	0·4	—	—	120	7·1
March ..	213	26·7	5	0·7	—	—	218	12·3
April ..	44	5·5	261	35·5	6	3·6	311	18·3
May	2	0·3	130	17·6	106	64·3	238	14·0
June	—	—	5	0·7	16	9·7	21	1·2
July	2	0·3	18	2·4	2	1·2	22	1·3
August ..	98	12·3	171	23·3	22	13·3	291	17·1
September ..	45	5·7	97	13·2	10	6·1	152	9·0
October ..	60	7·6	36	4·9	2	1·2	98	5·9
November ..	84	10·6	6	0·8	—	—	90	5·3
December ..	61	7·7	2	0·3	—	—	63	3·7
Total ..	800	100·7	735	100·0	165	100·0	1700	100·0

* Material relating to six species of Anatinae is included: 508 recoveries of Mallard, 294 of Teal, 126 of Garganey, 45 of Shoveler, 577 of Pintail, 96 of Gadwall, 54 of Wigeon.

Female Mallard

Caspian Sea and the lower Volga) in March, in the central zone in April and in the northern zone (the Karelian-Finnish S.S.R., Murman, the Arkhangelsk district) in May. These data correspond without a doubt to the actual position.

At the same time this material does not make it possible to compare the amounts of shooting in different zones, since parts of the duck populations of the northern and central zones of the U.S.S.R. are in practice hardly covered by ringing. For this reason the relative weight of spring shooting in the northern zone is obviously lowered—only 112 ringed duck, or 14·6% there, against 396, or 51·6% in the central, and 259, or 33·8%, in the southern zone. (The percentages were calculated from the total number of ringed duck obtained in the whole of the European part of the U.S.S.R. in March–May.) This disproportion appears also in comparing the intensity of autumn shooting in different zones; in August–October 203 birds, or 37·5% of the total of all ringed duck obtained in this period in the European part of the U.S.S.R., were obtained in the southern zone (Table XI), 304, or 54·4%, in the central zone, and only 34, or 6·3%, in the north. The peak numbers of ringed birds in all zones are obtained in August—the month when shooting begins.

According to the material relating to ringing, the intensity of autumn shooting is considerably less than that of spring shooting; in March–May in the European part of the U.S.S.R. 767 ringed duck were obtained, in August–October only 541. This in no way corresponds with the true position, and is due to the very small number of ducks ringed in their first summer.

The uselessness of the material relating to ringing in elucidating a number of important questions of duck ecology, a knowledge of which is necessary for planning shooting for sport and for trade (as is shown above), arises from the following defects in carrying out the ringing of waterfowl:

1. The fact that the total number of ducks ringed is inadequate for our large territory—only about 10,000 birds are ringed annually.

2. The limited character of the localities for mass ringing which are largely restricted to assembly places for moulting ducks in the southern regions of the country. Thus about 26% of the Mallard, 90% of the Wigeon, 96% of the Gadwall, 97% of the Teal and 99·8% of the Pintail ringed in 1950 in the U.S.S.R. were caught in the Astrakhan Sanctuary and adjoining regions.

3. The unequal covering of different species of duck. Of all ducks ringed in the U.S.S.R. in 1950, Pintail comprised 62·7%, Teal 17·7%, Mallard 8·7%, Garganey 6·4%, Shoveler 2·2%, Gadwall 1·5% and Wigeon only 0·8%.

4. The excessive uniformity of the sexual composition of the ducks ringed. In 1950, drakes formed 93% of the total number of ringed Mallard the sex of which was determined, drake Pintails were 74%, drake Wigeon 96%, drake Teal about 90%. This is due to the fact that the main mass of birds is ringed in the region of the Astrakhan Sanctuary, on the moulting grounds where adult males predominate.

5. Young birds of the year are almost completely omitted from ringing. Among duck ringed in 1950 in the U.S.S.R. young birds of the year formed 36% among Mallard and Shoveler, 3% among Gadwall, less than 2% among Teal, and only 0·5% among Pintail.

For these reasons ringing data give no indication at all of the relative extent to which spring and, in particular, autumn shooting is practised in different zones. The need of such data for planning shooting for sport and for trade is obvious and requires no further proofs.

The defects which have been indicated reduce misleadingly the percentages of females obtained in spring (Table IV), prevent the elucidation of the nature and the time of the dispersal of young birds from nesting-places in various localities in all zones, make it impossible to discover the extent to which various age and sex groups are shot or perish from natural causes in different years, and so on. . . .

On the basis of the above we consider it absolutely necessary, while increasing the amount of duck ringing in the places where they assemble for moulting in the south—the Kuban flats, the Volga delta, the lakes of the Naurzum and Baraba steppes, etc.—at the same time greatly to increase the ringing of wildfowl at the localities where they nest and moult in all zones of the Soviet Union, including the north. Given the necessary material support, the State Sanctuaries (Oka, Darwin, Kandalsksha, Pechoro-Ylych), the sanctuaries and stations of the Academy of Sciences of the U.S.S.R. and the Union Republics, the strongest and best organised hunting estates (on Lake Ilmen, etc.) can all become ringing centres. In these centres the catching and ringing of adult birds must be carried on in the spring, summer and autumn (which will ensure an increase in the percentage of recoveries). In the same places the mass ringing of ducks must be organised. In order to extend the work of ringing young birds, it is necessary to devise as soon as possible models of wing-tags which will make it possible to mark young that are still small and to supply these in sufficient quantities to a wide circle of markers. Besides this, it is necessary to ascertain the methods of catching birds on a mass scale on spring and autumn passage which are most effective under our conditions. Finally, it is necessary to direct attention towards improving the recording side of ringing: the correct identification of the species ringed, the determination of sex, of age, etc. It is necessary more widely to familiarise the public with the organisation of ringing work, to make it possible to increase the return of rings. Increase of the scope and alteration of the character of the organisation of ringing of wildfowl will make it possible to utilise the results of ringing on a wide scale in order to improve the planning of shooting.

If put into effect, the measures which are proposed in the present paper for properly organising wildfowl shooting will, without doubt, result in the immediate future in increasing the supplies of this group of birds in our shooting territories.