

Joanna GLIWICZ

THE DYNAMICS OF THE COLONY OF BLACK-HEADED GULL
(*LARUS RIDIBUNDUS* L.)
ON FISH PONDS AT STAWINOGA NEAR NAREW RIVER*

Observation object provided the colony of black-headed gull nesting on the area of fish ponds at Stawinoga near Narew River. On the base of observations taken each two weeks during the period from April 18 until September 1, 1964 it has been found that the location of the colony on a pond in vicinity of river does not remain without an influence upon the course of nesting, the range of penetration (feeding), activity of birds, and time of abandoning the nest site.

Object for study provided the breeding colony of *Larus ridibundus* L. on fish ponds at Stawinoga on Narew River. The pond, on which the colony was situated, was located at the distance of about 200 m from river. There are known from literature colonies of, among others, black-headed gull situated on ponds without any river neighbourhood (Bocheński 1962b, Goodbody 1955) or on a river itself (Luniak 1963).

The purpose of the present paper was to examine how birds do utilize both environments - vicinity of pond and river and what effect such conditions exert on their way of living and the course of nesting, with particular reference to the dispersal of birds when juveniles become independent. The goal of the work was to refine and present in quantitative approach phenomena observed on the area during years 1961-1963 by the staff of the Ornithological Laboratory, University of Warsaw.

* From the Institute of Zoology University of Warsaw.

I. AREA, MATERIAL AND PROCEDURES

The area of author's observations included one of fish ponds within the Fish at Stawinoga near Zatory, Pułtusk county and a 15 km long section of the Narew River (Fig. 1). The pond was 42 ha in area, shallow (maximal depth

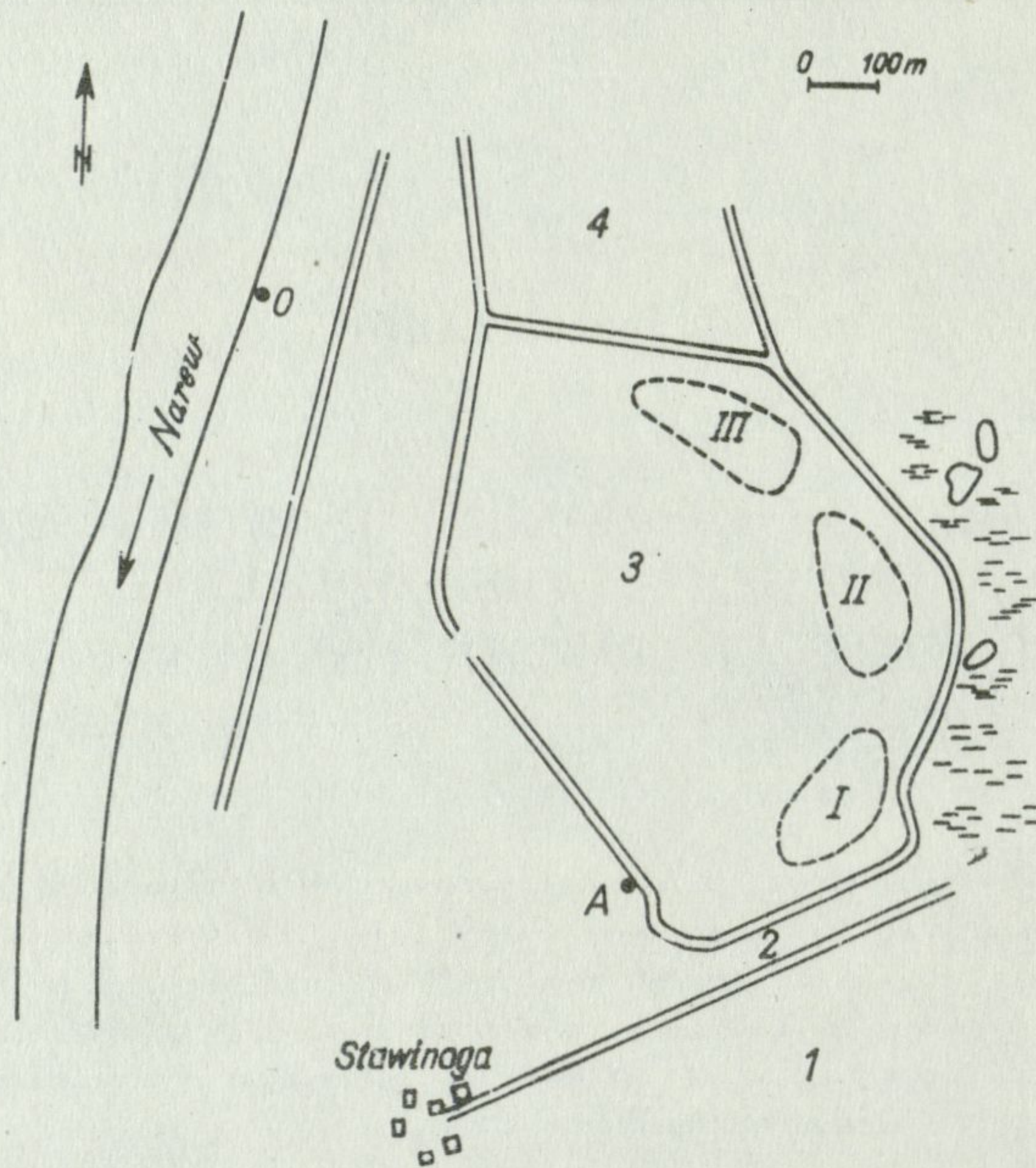


Fig. 1. Area of fish pond at Stawinoga near Narew River

1 - meadow, 2, - arable field, 3 - pond, 4 - unflooded pond, A - observational point on dam, O - the closest observational point on Narew, I, II, III - gull subcolonies

1 m) and in $\frac{1}{3}$ grown with the reed *Phragmites communis* Trin., and sedge *Carex* sp. To the north it adjoins another pond, unflooded one, also partially covered with reed and sedges, to the south - a narrow strip of cultivable land and extensive tract of meadows. To the east the pond adjoins to wet areas grown with basket willow, with small patches of water. Along to its western bank runs a dam frequented by humans. At a distance of circa 500 m from the pond there are first buildings of Stawinoga village, and at a distance of 200 m there flows Narew River.

The pond is from several years a breeding site of *Larus rididundus* L. The colony of black-headed gull occurring on the studied pond consists of three subcolonies.

The observational material concerning the biology and distribution of black-headed gull within the 15 km long section of Narew has been collect-

ed during the period from April 18 until September 1, 1964 at two weeks intervals.

Three types of observations have been taken:

1. Observations aimed at the collection of information about the number of nests in colony, the stage of clutch advancement, number of eggs in nests, number and mobility of young. These observations were taken at various time intervals from a boat or directly from water.

2. Observations, concerning the mobility of gulls in colony, were taken three times at monthly intervals. They concerned the arrival and departure of birds. They were taken during the whole day beginning with 5 a.m. until 8 p.m., each two hours with the duration of one observation of 10 minutes. Observations were taken from a place plotted on the sketch (Fig. 1) and denoted by A. They concerned flights in two directions. To the south on a farm land and meadow and to the north-east on Narew River. The study on mobility of birds with the aid of 10 minute stationary observations presents an accepted by ornithologists techniques (Bień, Dobrowolski 1961). Due to the location of point A these observations included, as a rule, flights of birds on a farm land only from the subcolony I and II¹, while flights on Narew River from all three subcolonies.

3. Observations concerning the dispersal of gulls throughout the Narew River. At various time of day I went on a bicycle along the bank of Narew a 7 km long distance in one or the other direction from Stawinoga and recorded the number of gulls per one kilometer. There has been noted also if they are single or in flocks. Observations of the second and third type were taken with the aid of 8 x 40 field-glasses.

In the elaboration of the collected material I distinguished three periods being in accordance with the biological cycle of gull colony:

I. April, May, June – the period of the occurrence of exclusively adult birds on the river and pond. Construction of nests, nesting and feeding of young.

II. July – adult and juvenile birds limited to the closest section of river.

III. August – the dispersal of birds throughout Narew and Bug Rivers (Bug joins Narew 9 km downstream from Stawinoga).

The colony of black-headed gulls on the pond at Stawinoga seems to be the only breeding colony in forks of Bug and Narew (Narew from Serock to Łubienica – 15 km, Bug from Serock to Janki – 10 km). It consists of three subcolonies distinct in territorial and social way. The first subcolony is situated in the southern portion of pond in the close neighbourhood of arable field, meadow and human settlements. The subcolony contained more than 250 nests.

¹ Birds from subcolony III do not fly on the farm land.

The second one extends along the eastern bank, but because of the configuration of the adjacent area gulls do not cross this bank. There were circa 150 nests in it. The third subcolony occupies the northern portion of the reservoir close to the unflooded pond. It consisted of 350 nests.

Altogether the colony numbered more than 750 nests of black-headed gulls. As it is known the size of colony from 100 to 1,000 nests is very typical and most frequent (Bocheński 1962b, Makatsch 1952).

In this colony there were nesting also few grebes of several species (*Podiceps*) and coots (*Fulica atra* L.). Bocheński (1958) also describes such mixed colonies. Besides, in the second subcolony one pair of mute swan (*Cygnus olor* Gm.) nested.

II. ANALYSIS OF RESULTS

1. The course of nesting in the colony

In mid-April all subcolonies were settled and birds started the constructing of nests. Within the colony I met all three types of nests (Bocheński 1962b, Makatsch 1952): on solid ground, on plant clumps, and floating ones. The greatest number of nests belonged to the second type – on clumps of vegetation. They have been constructed first of all of reed. This material was easily available, occurring in surplus.

During the observation taking on May 13 and 14 I found that the construction of nests was completed in all subcolonies, and in majority of nests there were three eggs laid. Some nests had two eggs, while circa 5% of nests were empty.

Next observations on colony came as lately as from July 1 and 2. At this time I watched for the first time juvenile gulls on the sheet of pond. They were keeping themselves, in general, close to the colony and began to fly. In the whole colony the incubation period was already over, in some nests young were quite small and were leaving the nest only when in danger.

During the third week of July (16, 17), when juvenile gulls got mobile, birds were leaving the colony. Only birds from the third subcolony, which has been delayed in nesting, remained for some time on the area of pond. Only single individuals remained on the pond from the first and second subcolony.

On July 27 I noted only 5 birds on the area of colony, while on August 1 and September 1 there was no one gull on the pond.

The nesting period of black-headed gulls at Stawinoga is identical with the nesting period of this species in other colonies on the area of Poland (fish pond at Gołysz on Cieszyn Silesia (Bocheński 1960), Kruklin Lake on Mazury Lakeland and ponds at Kobyłka near Warsaw (Jabłoński – personal

communication). The delay in nesting in the third subcolony (about one week) was, perhaps, connected with the destroying of a part of first clutch by neighbouring people. The destroying of gulls' eggs was noted in this area during previous years. Some other, unseizable factors might played here also some role.

Literature gives various dates for leaving colonies by young black-headed gulls when capable of flight. Bocheński (1960) states, e.g. that birds remain on the area of colony until the end of August. Makatsch (1952) is of opinion that birds leave the colony immediately, when juveniles are capable of flight (the period of departure begins in mid-July). Finally, according to Bannikov and Micheev (1956) males depart in mid-July, 10 days later females, while juveniles with the beginning of August. In the colony studied by me conditions were specific (vicinity of river). As soon as juveniles got the ability of flight birds moved from the area of ponds at Stawinoga to the closest section of Narew and remained there until first days of August.

2. Mobility of colony

The mobility of black-headed gull colony, expressed by numbers of arrivals and departures from nesting site, is for the whole nesting period variable during a day. Fig. 2 presents the curve of changes in colony mobility during a day. Points determining the curve are means from five all-day long observations (May 15, May 16, June 15, June 16, and July 16, 1964). The morning peak, decline in mobility at noon, and an increase in afternoon and at night are distinctly marked.

The mobility of colony consists of flight on river, mainly for feeding, and on meadow and arable land, which present the "common zone" for all gulls from the first and second subcolony. Such a "common zone" for gulls from the third subcolony presents probably the unflooded pond. On these areas birds sit in greater or smaller numbers during the whole day. During a late afternoon, about 8 p.m., I recorded 150 gulls on a meadow, while 60 of them on the

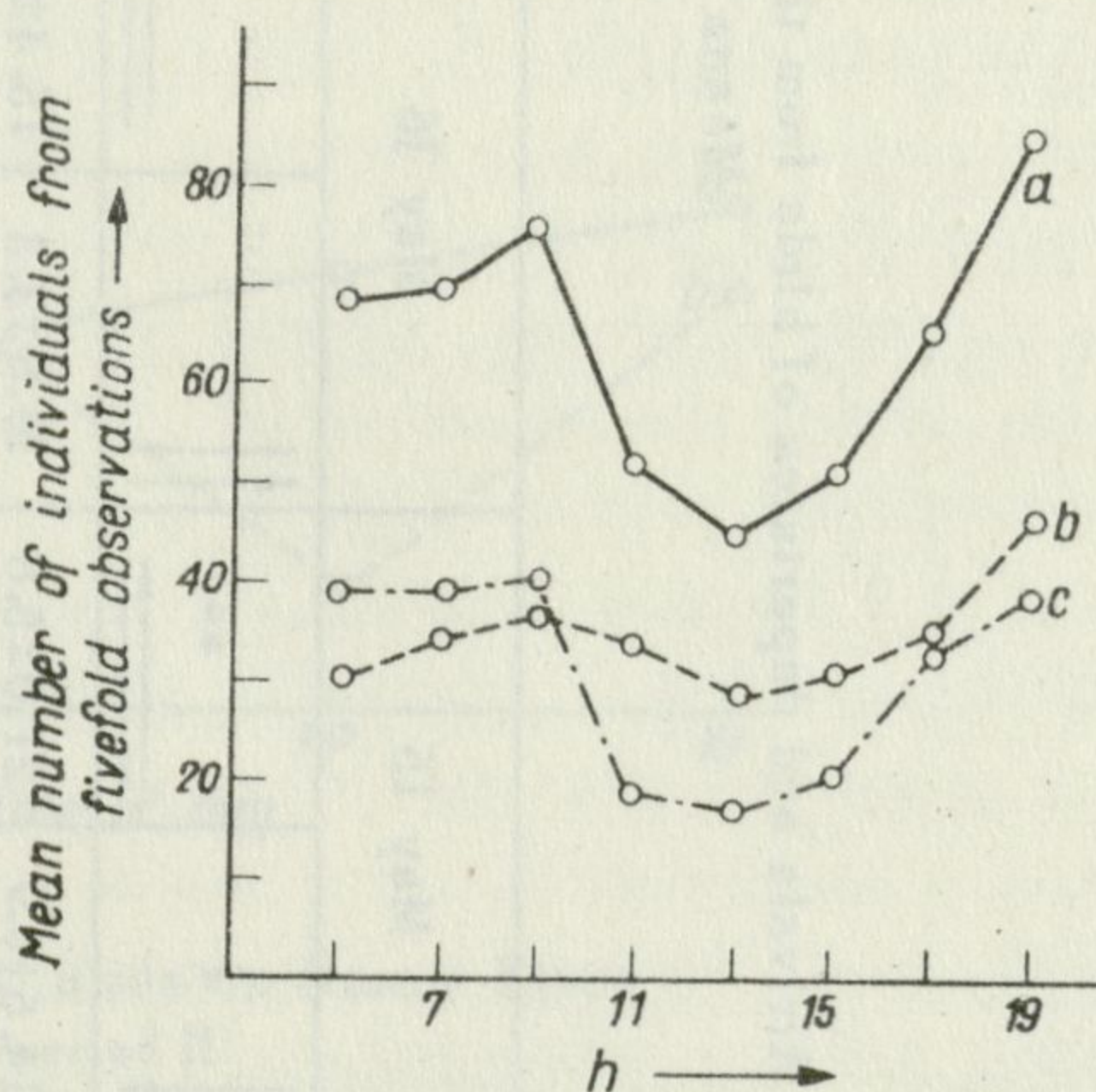
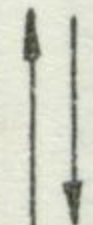
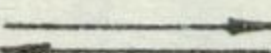
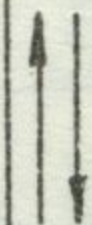
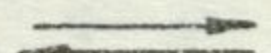
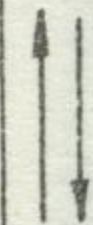
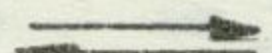
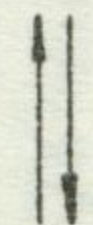
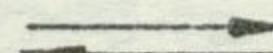
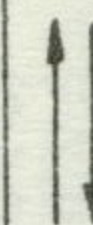
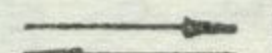


Fig. 2. Mobility of gulls in colony during a day
a - general mobility, b - departures, c - arrivals

Arrivals and departures of birds from the colony in 10 minute samples for individual days.
Means and mean deviations

Tab. I

	May 15		May 16		June 15****		June 16		July 16	
	 *	 **								
Arrival	14.6±3.9	21.0±5.6	10.8±3.3	15.4±2.6	10.0±1.2	8.8±1.9	34.6±6.2	21.0±6.1	1.6±0.6	4.3±1.2
Departure***	18.0±4.7	27.0±7.6	13.7±2.8	17.7±3.2	23.0±2.9	15.6±3.1	29.6±3.5	17.5±1.5	1.6±0.6	4.0±0.9

* Flight of birds from the first and second subcolony on arable fields and meadow, and back.

** Flight of birds from the first, second and third subcolony in the direction of Narew River and back.

*** Slight prevalence of departures over arrivals marked in the table is statistically insignificant.

**** Observations on June 15 have been taken only from 12 a.m. to 8 p.m. Statistically significant prevalence of departures is probably related with the flight of birds to roosting places.

unflooded meadow. It is my opinion that these areas are used by birds, which at a moment are out of nest, as also as sleeping place.

Moynihan (1955) also describes the presence of such "common zone" in the colony of black-headed gulls.

Birds were feeding also on these areas. The feeding of black-headed gulls on arable lands was described by Bocheński (1958, 1962a). In the case of colony at Stawinoga the river presented, however, the main feeding area.

Quantitative ratio of birds leaving the colony to those arriving at its area during a day amounted to circa 1 (tested with the aid of the deviation from mean error). The low mobility of birds on July 16 (Tab. D) is connected with the low number of birds on the area of colony.

3. Activity of birds on river

In connection with the vicinity of river gulls penetrate it mostly in a 15 km long section (7 km upstream and 7 km downstream from Stawinoga). The area permanently penetrated by gulls presents a section of Narew situated closest to the "gull" pond at Stawinoga (6–8 km of embankment from bridge at Wierzbica).

I studied the diurnal activity of gulls during various biological periods on this river section. This activity is illustrated by the mean¹ number of gulls

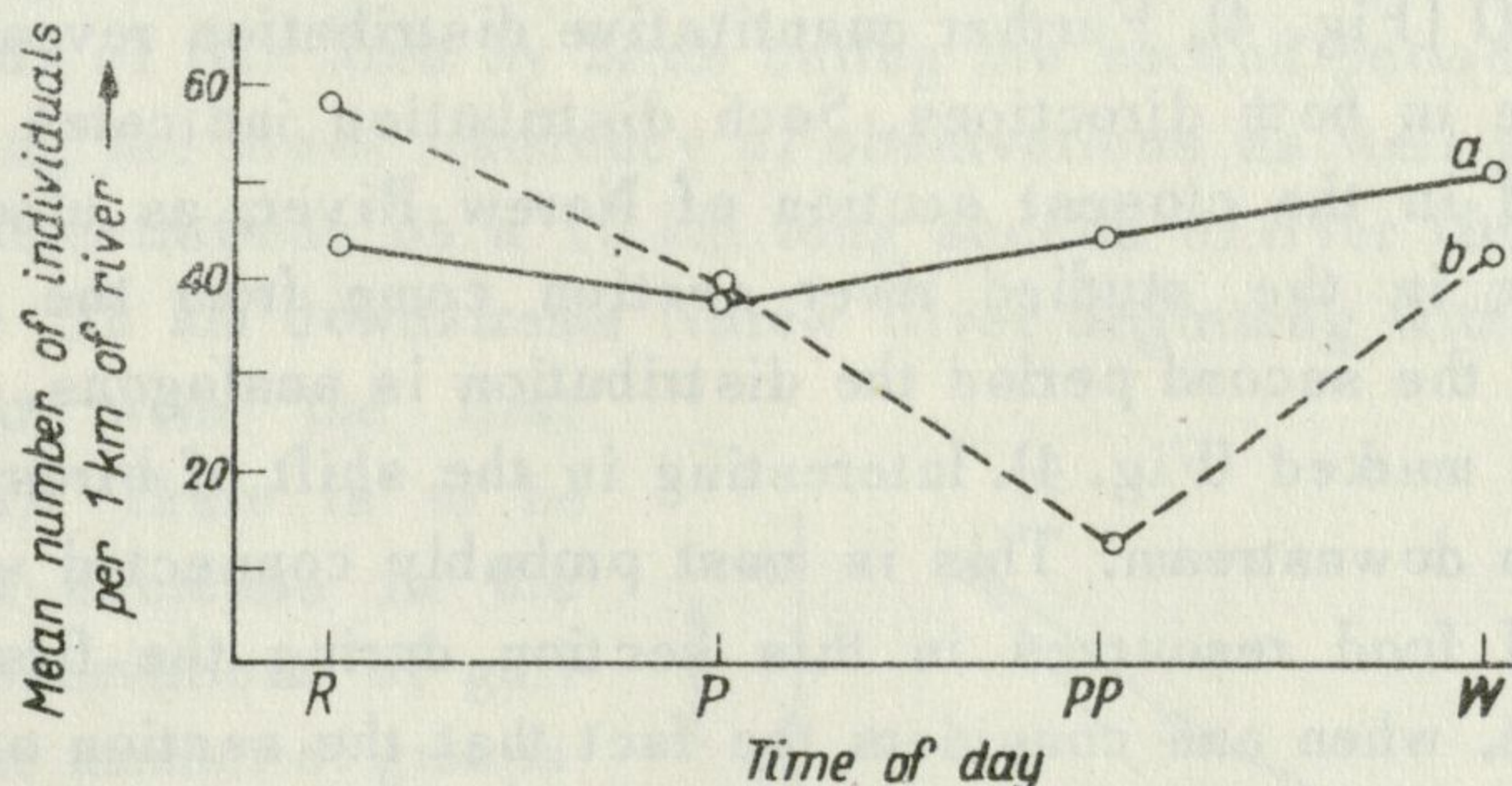


Fig. 3. Daily activity of birds on Narew River
a - period I, b - period II

per kilometer at various time of day: morning, at noon, afternoon, and at night (Fig. 3). During the first period the diurnal activity on river was during the whole time uniform, although one may note the trend toward a decrease in activity during noon hours. During the second period one can note a differen-

¹Mean from all observations concerning this section taken during the definite biological period.

tiation in activity of birds throughout a day. There is marked a high morning peak and somewhat lower one at night. During the third period diurnal activity has not been studied, since the total number of gulls was low in this area.

Such a pattern of activity during first two periods can be explained by the various degree of breeding advancement. During the first period birds, which do not sit on nest, feed incubating birds and later nestlings. Youngs of black-headed gull belong to seminidicolous group and in spite of feather cover and well developed legs unwillingly leave nests and are being fed by parents during a long period of time (Makatsch 1957). Hence the uniform during the whole day activity of adult gulls on river, which, as it was mentioned, presents the main reservoir of food. During the second period, when there are adult birds and independent juveniles, the diagram of activity acquires the form characteristic for black-headed gull population (Dobrowolski 1959, 1964, Luniak 1963).

4. Dispersion of gulls throughout the river

Gulls from colony at Stawinoga flew downstream to the bridge at Wierzbica (7 km) and upstream (6–7 km) from Stawinoga. I found statistically significant, distinct decline in number of birds from Stawinoga in both directions. During the first period the greatest number of gulls occurred in the point O (Fig. 1) and within the section between 1 km upstream and 1 km downstream from the point O (Fig. 4). Further quantitative distribution reveals a permanent, uniform decline in both directions. Such distribution indicates the sufficient amount of food in the closest section of Narew River, as also the fact that gulls occurring in the studied river section come from the colony at Stawinoga. During the second period the distribution is analogous, although some differences are marked (Fig. 4). Interesting is the shift of birds from 1 km upstream to 1 km downstream. This is most probably connected with the partial exploitation of food resources in this section during the first period. This seems probable, when one considers the fact that the section of Narew River, on which observations were taken, is included by the embanked portion of river situated upstream to Zegrzyn Flood. The rate of water flow is low in this section. Another interesting fact presents the distinct increase in the number of gulls on the section of 7–8 km upstream from Stawinoga. During the first period this fact has not been noted since the area was not covered by observations. Occurring there birds came from the upstream and from aside. This probably proves the presence of another colony of gulls in the vicinity of Pułtusk. During the third period the number of birds generally declined. The quantitative distribution within the studied section is more uniform and there are no regularities found in previous periods (Fig. 4).

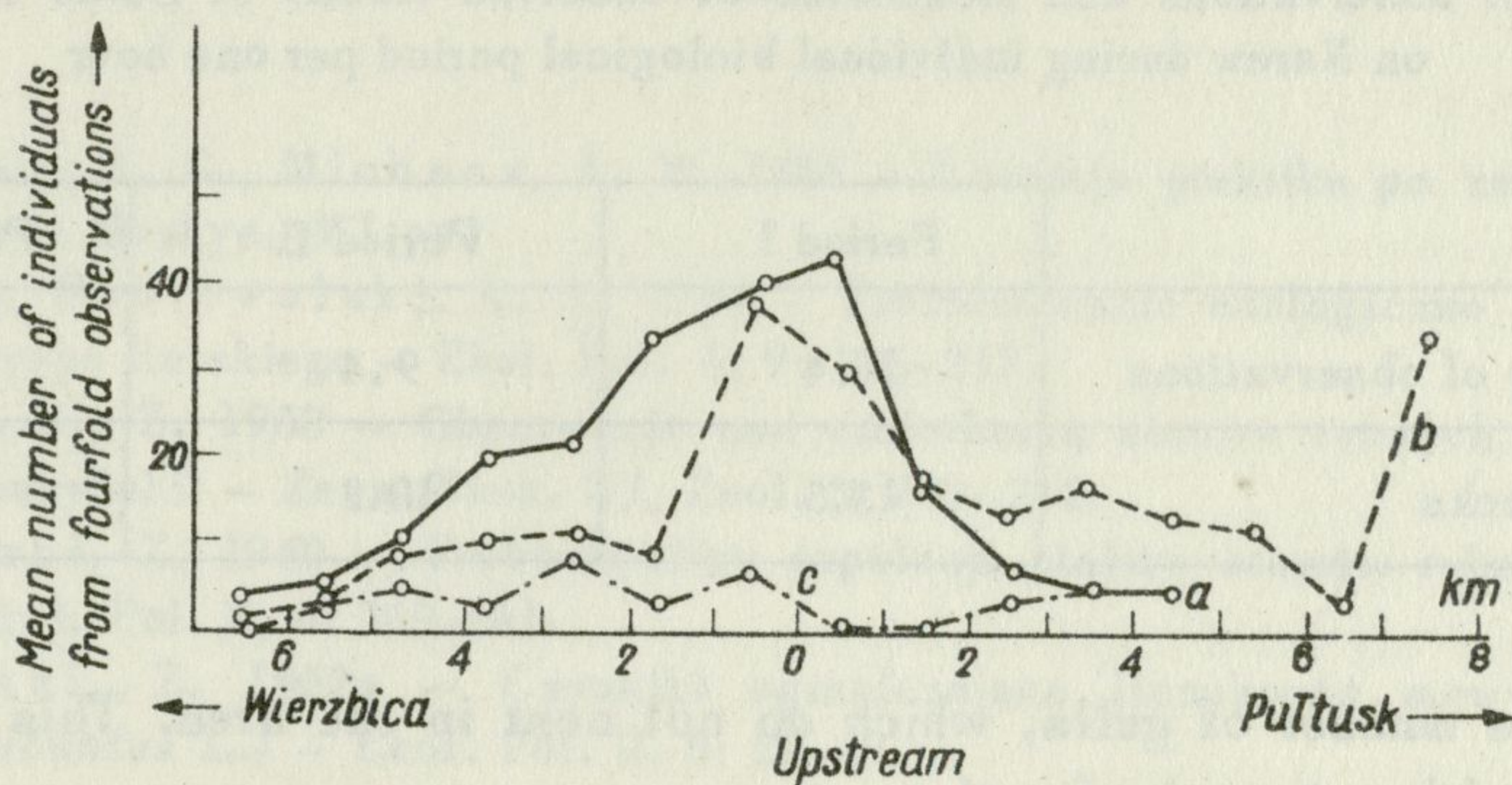


Fig. 4. Dispersion of gulls throughout Narew River
a - period I, b - period II, c - period III

One could expect that along with the move of juvenile and adult birds from the colony to the nearest section of river, there will be formed a greater concentration of gulls, when compared with the first period. Per cent distribution of number of birds, however, in successive kilometers from point 0 for the first and second period deviate slightly from each other (Fig. 5). This proves the full independence of juveniles, which penetrate other sections of river equally with adult birds, as also the gradual transfer from the colony, and later leaving the closest section of river by gulls. The supposition about a gradual leaving of this area by birds during the second period, is confirmed by data revealing the lower frequency of observations as well as by the size of observed concentrations on a 10 km long section of river (from the 5th km upstream to the 5th km downstream Narew River beginning with the point 0), when compared with the first period (Tab. II). There is to be noted a slight decrease in the frequency of observations of gull groups and in the number of groups during the second period, and a rapid decline during the third period. This rapid decline is connected with the dispersion of gulls on a large area of Narew and Bug rivers. Birds maintained afterwards an uniform number in this area.

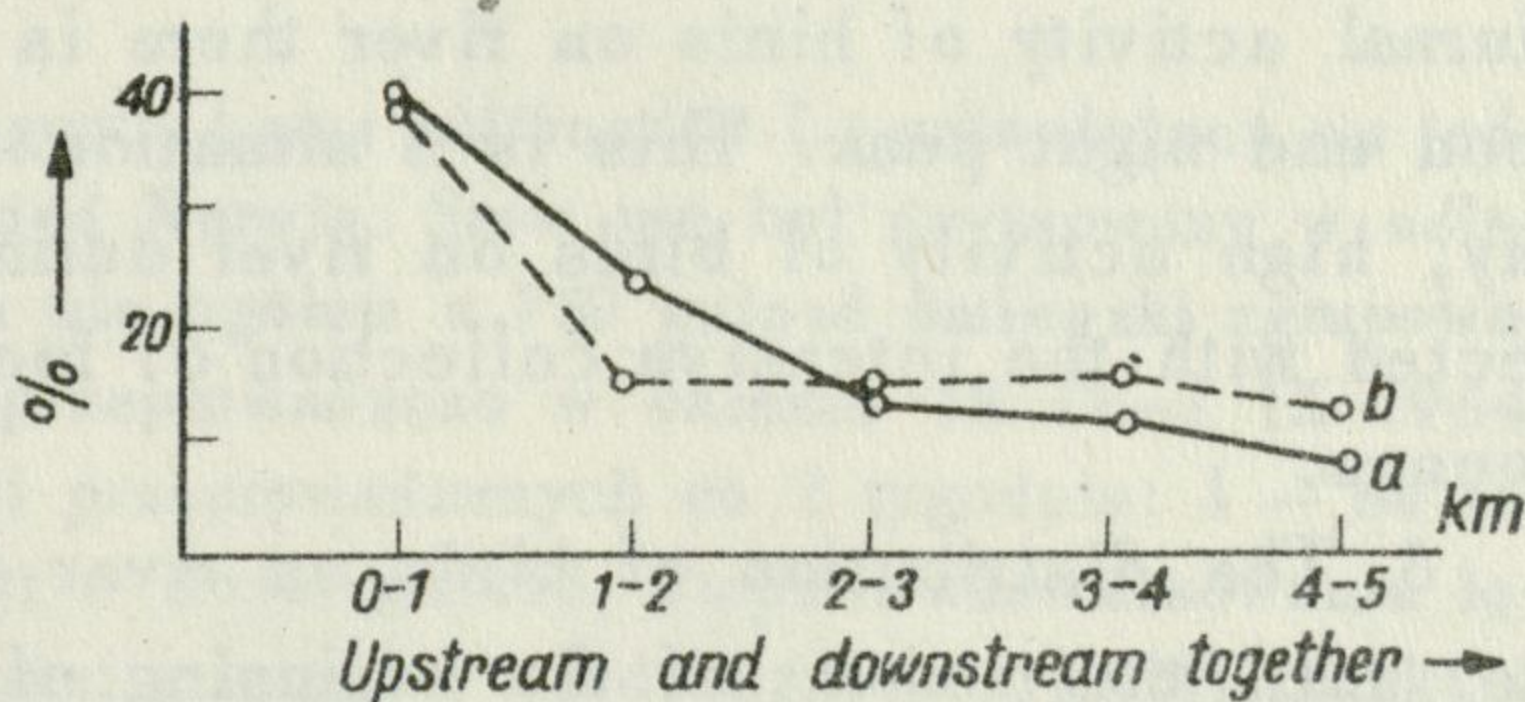


Fig. 5. Decline in number of gulls on successive kilometers of Narew expressed as per cents
a - period I, b - period II

In September, as it results from materials collected by the Ornithological Laboratory, University of Warsaw, there occurs on Zegrzyn Flood a rapid

Frequency of observations and mean size of observed flocks of *Larus ridibundus* L. on Narew during individual biological period per one hour

Tab. II

	Period I	Period II	Period III
Frequency of observations	10.4	9.4	5.4
Size of flocks	13.5	10.2	2.9

increase in number of gulls, which do not nest in the area. This increase is connected with autumnal migrations.

III. RECAPITULATION

1. Nesting period of black-headed gulls recorded for four colonies in various regions of Poland overlap with each other.

2. Birds from the colony of *Larus ridibundus* L. at Stawinoga use two environments – a pond and its neighbourhood – the nesting and loafing site, and a river – main area of feeding.

3. When nesting site and feeding ground of *L. ridibundus* L. do not overlap, birds may move entirely to the feeding grounds as soon as juveniles are capable of flight. In the given situation birds from ponds at Stawinoga moved to the adjacent section of river.

4. The neighbourhood of river, which provides the feeding ground, causes that the colony of *L. ridibundus* L. does not disperse until the moment of the beginning of autumnal migrations.

5. In the mobility of the colony of *L. ridibundus* L. during a day and in diurnal activity of birds on river there is marked a morning peak, decline at noon and night peak. This is a situation characteristic for this species. All-day, high activity of birds on river during the first period is probably connected with the intensive collection of food for birds sitting on nests and for young.

6. The distribution of birds on river during the first and second period, i.e. until the moment of the beginning of autumnal migrations, indicated the sufficient quantity of food within the closest section of river, and also, the complete independence of juveniles, which during the second period keep pace with adult birds in the penetration of the whole 10 km long section of river (5 km downstream and 5 km upstream from Stawinoga).

Author appreciates valuable suggestions and assistance in carrying out the work by Prof. Dr. Zdzisław Raabe and Dr. Kazimierz Dobrowolski.

REFERENCES

1. Bannikov, A. G., Micheev, A. V. 1956 – Letniaja praktika po zoołogii pozvonočnych – Moskva, 471 pp.
2. Bień, Z., Dobrowolski, K. A. 1961 – Zróżnicowanie ekologiczne mew (*Larinae*) Półwyspu Helskiego – Ekol. Pol. A, 9: 195–218.
3. Bocheński, Z. 1958 – Obserwacje nad omitofauną stawów rybnych w Gołyszcu (Śląsk Cieszyński) – Zesz. Nauk. UJ, Zool. 3: 203–222.
4. Bocheński, Z. 1960 – Próba analizy populacji ptaków stawów rybnych w Gołyszcu – Ekol. Pol. B, 6: 269–281.
5. Bocheński, Z. 1962a – Czynniki ograniczające liczebność mewy śmieszki (*Larus ridibundus* L.) – Ekol. Pol. B, 8: 29–41.
6. Bocheński, Z. 1962b – Nesting of Black-headed Gull (*Larus ridibundus* L.) – Acta Zool. Cracov. 7: 87–104.
7. Dobrowolski, K. A. 1959 – Badanie rytmu dziennego pewnych gatunków ptaków wodnych – Ekol. Pol. A, 7: 21–54.
8. Dobrowolski, K. A. 1964 – Studies on ecological adaptations of birds of the Vistula River – Ekol. Pol. A, 12: 616–651.
9. Goodbody, I. 1955 – The breeding of the Black-headed Gull – Bird Study Vol 2, No 4: 192–199.
10. Luniak, M. 1963 – Badania nad dynamiką liczebności i kierunkami lotów niektórych gatunków *Laridae* na Wiśle pod Warszawą – Acta Omith., 7: 90–113.
11. Makatsch, W. 1952 – Die Lachmöwe – Neue Brehm Büch 56, Leipzig 98 pp.
12. Makatsch, W. 1957 – Ptak, gniazdo, jajo, piskłę – Warszawa 315 pp.
13. Moynihan, M. 1955 – Some aspects of reproductive behavior in the Black-headed Gull and related species – Behavior, Suppl. IV, 201 pp.

DYNAMIKA KOLONII MEWY ŚMIESZKI (*LARUS RIDIBUNDUS* L.)
NA RYBNYCH STAWACH W STAWINODZE NAD NARWIĄ

Streszczenie

Obiektem obserwacji była kolonia lęgowa *Larus ridibundus* L. gniazdująca na jednym ze stawów rybnych w Stawinodze nad Narwią. Staw ten był usytuowany w odległości 200 m od rzeki. Kolonia składała się ogółem z 750 gniazd śmieszki zgrupowanych w trzech podkoloniach. Badania przeprowadzono w okresie 18 IV–1 IX 1964. Składały się na nie trzy typy obserwacji przeprowadzanych co 2 tygodnie: 1 – na terenie kolonii, w celu zebrania informacji o ilości gniazd, stopniu zaawansowania lęgu, ilości jaj w gniazdach oraz liczebności i lotności młodych; 2 – z grobli (punkt A na fig. 1) w celu zbadania ruchliwości mew w kolonii (liczba mew wylatująca i przylatująca do kolonii w czasie 10 minutowych obserwacji stacjonarnych przeprowadzanych co 2 godziny); 3 – na 10 kilometrowym odcinku Narwi (od 5 km górnego do 5 km dolnego biegu rzeki od Stawinogi), w celu zbadania aktywności dziennej ptaków i ich rozproszenia.

Na podstawie zebranych materiałów, w dynamice kolonii ze Stawinogi można wyróżnić trzy okresy (okresy te są zgodne z etapami cyklu biologicznego typowej kolonii *Larus ridibundus*):

I – kwiecień, maj, czerwiec – okres występowania na rzece i stawie tylko dorosłych ptaków (budowa gniazd, wysiadywanie i karmienie młodych)

II – lipiec – ptaki dorosłe i młode (po uzyskaniu zdolności lotu) związane z najbliższym odcinkiem rzeki

III – sierpień – rozproszenie ptaków na Narwi i Bugu (Bug zlewa się z Narwią 9 km poniżej Stawinogi), rozpoczęcie wędrówek jesiennych.

Na podstawie zebranych materiałów stwierdzono:

1. Okresy gniazdowania mewy śmieszki zaobserwowane dla 4 kolonii w różnych rejonach Polski pokrywają się ze sobą.

2. Ptaki z kolonii *Larus ridibundus* L. w Stawinodze korzystają z dwóch środowisk: stawu i jego okolic jako miejsca gniazdowania oraz z rzeki – terenu żerowania (fig. 1).

3. Gdy teren gniazdowania i teren żerowania *L. ridibundus* nie pokrywają się ze sobą, ptaki mogą przenieść się całkowicie na teren żerowania z chwilą uzyskania przez młode zdolności lotu. W konkretnej sytuacji ptaki ze stawów w Stawinodze przeniosły się na pobliski odcinek rzeki.

4. Sąsiedztwo rzeki, która staje się terenem żerowania, powoduje, że kolonia *L. ridibundus* nie rozprasza się do momentu rozpoczęcia wędrówek jesiennych.

5. W ruchliwości kolonii w ciągu dnia (fig. 2) i w aktywności dziennej ptaków na rzece (fig. 3) zarysowuje się szczyt ranny, spadek w południe i szczyt wieczorny. Jest to sytuacja charakterystyczna dla tego gatunku. Całodzienna wysoka aktywność na rzece w okresie pierwszym jest prawdopodobnie związana z intensywnym zbieraniem pokarmu dla ptaków siedzących na gnieździe i piskląt.

6. Rozmieszczenie ptaków na rzece w okresie pierwszym i drugim (fig. 4 i 5), tzn. do momentu rozpoczęcia wędrówek jesiennych, wskazuje na dostateczną ilość pokarmu na najbliższym odcinku rzeki, a także, na całkowitą samodzielność młodych, które w okresie drugim na równi ze starymi penetrują cały 10 kilometrowy odcinek rzeki (5 km w dół i 5 km w górę Narwi od Stawinogi).

AUTHOR'S ADDRESS:

Mgr Joanna Gliwicz
Institute of Zoology,
University of Warsaw
Krakowskie Przedmieście 26/28,
Poland.