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Southern elephant seal
(*Mirounga leonina* L.)
of Admiralty Bay
(King George Island,
South Shetland Islands).
Its numbers and activity during
the moulting season in summer
1978/1979 *)

ABSTRACT: Studies on southern elephant seal (*Mirounga leonina*) were carried in Admiralty Bay (King George Island, South Shetland Islands) in summer 1978/1979. In the whole region of Bay the maximum number of 964 elephant seals was noticed on 5 Jan. 1979. The biggest nonbreeding colonies were observed in the mouth region of the Bay.

In December the males made up 74% of the whole population, their number decreased to 17% in February. Most individuals belonged to the IV class of age (6-9 years old).

Introductory observations of 24 h activity indicates four peaks of activity in the groups observed on the coast. The type of weather has influenced the activity of these groups and the frequency of descending to the sea.

Key words: Antarctic, South Shetland Islands, *Mirounga leonina*, diurnal activity

1. Introduction

The literature contains only scarce informations on the elephant seal from South Shetlands. In summer 1957/1958 all the seals of South Shetland Islands have been counted during the helicopter flights and the established number of elephant seals amounted 6 940-7 515 (Aguayo 1970). There is more informations from the Elephant Island (Hunt 1973) and from King George Island. In the north-western part of the latter near the Russian

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station Bellingshausen about 830 elephant seals were observed by Krylov (1972) and Krylov and Medvedev (1972) in summer 1968. In this region Popov and Krylov (1978) had noticed 690 elephant seal in December 1973, 985 individuals in December 1974, and as much as 1918 individuals in January 1975. In the southern part of King George Island, Müller-Schwarze et al. (1978) has observed a small breeding colony near Point Thomas in the Admiralty Bay in summer 1976.

The problems of behaviour in breeding colonies are well known from numerous papers. They concern mainly the northern elephant seal (*Mirounga angustirostris* L.) living on the islands close to the Californian and Mexican coast. This region is systematically observed (Bartholomew 1952, Bartholomew and Hubbs 1960, Le Boeuf 1971, 1972, Le Boeuf and Peterson 1969, Sandegren 1976).

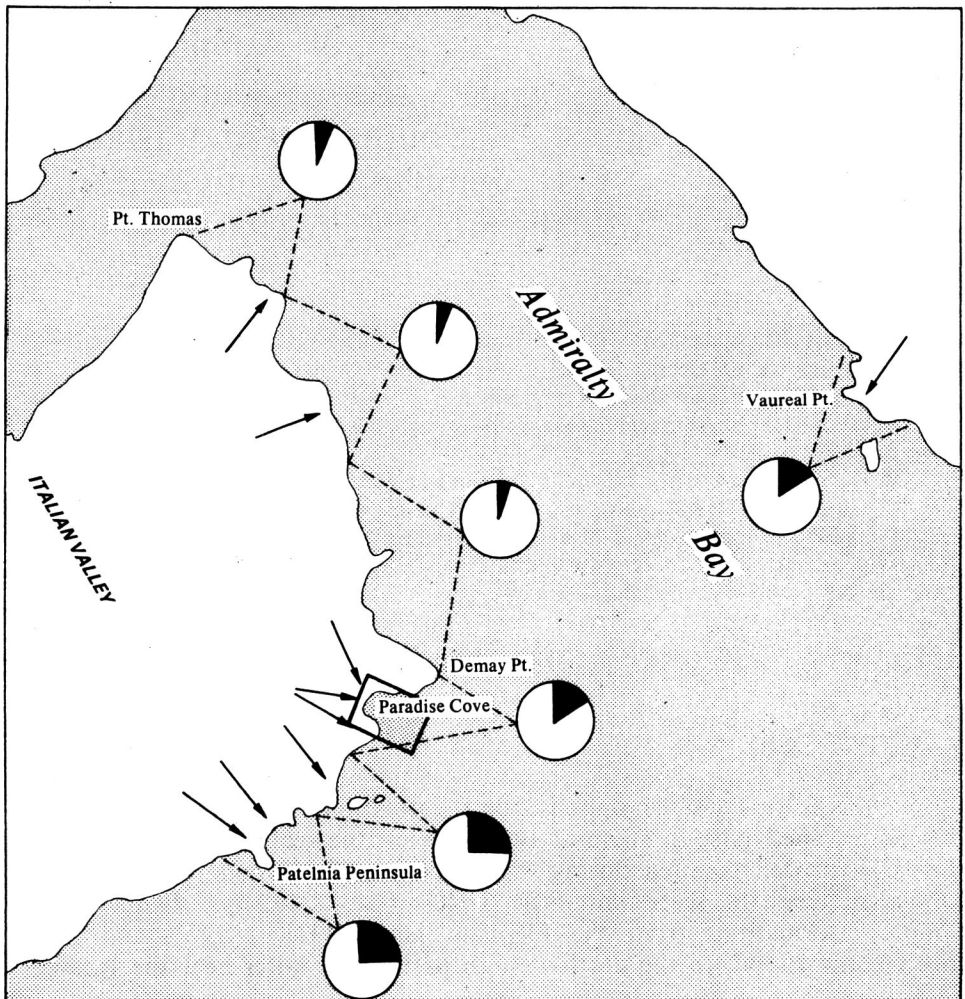


Fig. 1. Distribution of elephant seals in Admiralty Bay, on 5 January 1979
Circular diagrams show the percentage of the total seals number

The behaviour of southern elephant seal was examined by Laws (1953, 1956 a, 1956 b), Angot (1954), Carric and Ingam (1960), and Carric, Scorgas and Ingam (1962). These authors also observed the animals mainly in breeding time.

The aim of my work was the investigation of distribution and size of population of southern elephant seal, its sex and age structure and activity in non-breeding colonies in Admiralty Bay (King George Island, South Shetland Islands).

2. Methods

The observations were performed in the region of Polish Antarctic Arctowski Station in Admiralty Bay, from 10 December 1978 to 18 February 1979. The part of the coast from the Patelnia Peninsula to Italian Valley (Fig. 1) was systematically observed. The counts of the whole elephant seals populations in the whole Bay region were made twice (5 January and 10 February 1979). A system of age classification — six classes defined by phenotypic data — was acc. to Laws (1953), based on elephant seal population from South Georgia.

Studies on diurnal rhythm of activity were carried out in the Paradise Cove region (Fig. 2). Ten 24h observations were performed. In January two groups of males were observed (together about 60 animals in total), and in February — three groups of females (about 160 animals in total). Observations lasting 20 minutes were made, every hour for the males and every two hours for the females. There were estimated the number of seals

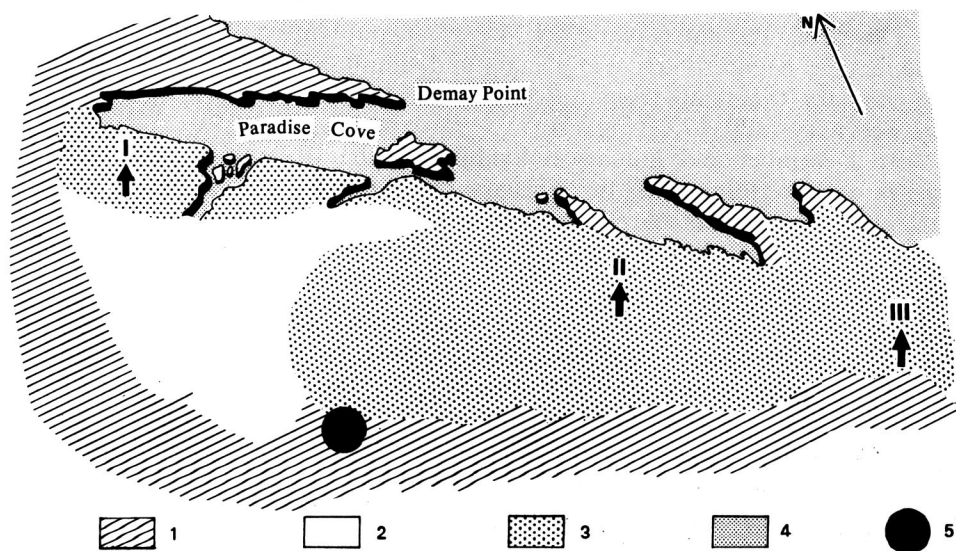


Fig. 2. A plan of observation area of Paradise Cove

The arrows indicate three permanent rookery places (I—III).

1 — rock, 2 — snow, 3 — beach, 4 — sea, 5 — the observer's place

lying on the coast and the number of active individuals, i.e. fighting, moving inside the group and migrating from one to another group. Some seals have been labeled to study the migration of particular individuals.

3. Results

3. 1. Number and distribution of population

The big colonies of elephant seals had their stable rookery places located as shown on the map (Fig. 1). The elephant seals prefer the mouth region of the Bay and form there the biggest colonies. In the region from Patelnia Peninsula to Demay Point and by Vaureal Peak stayed about 70—80% of all elephant seals observed in the Bay during the summer 1978/1979. Deeper inside the Bay the big groups were met to Thomas Point and only some single individuals penetrated further. It was shown in experiments with labeling that particular individuals may move from one colony to another, but the localization of colonies was stable.

The number of seals in the whole region of the Bay reached 964 individuals on 5 January and 639 individuals on 10 February 1979. In the region of permanent observation the population size was the biggest in the first day of observation (22 December 1978) and amounted to 808 seals. From this day on the number of seals systematically decreased to 609 individuals on 14 February 1979.

3. 2. Age and sex structure

The age and sex structure changed along with the size of population. In December the males made up 74% of all population. By the end January the females begun to arrive in a mass and simultaneously the males departed. In January the males constituted by average 48% of the population, and in February only 17% (Fig. 3).

In December and January individuals of the III and IV age class (3—9 years old) predominated. In February the majority of seals belonged to the IV class (6—9 years old) — Fig. 4.

3. 3. Diurnal rhythm activity

The observations were performed mainly in Paradise Cove, with the help of 7×45 binoculars. The observer on the high rock over the Bay had a good view on three existing in this region of the Bay groups of elephant seal (Fig. 2). On 6—7 January there were observed two groups of males of different age (positions I and II on Fig. 2), 62 individuals in total and 9 females. On 2—7 February the observations were performed on three groups constituted mainly of females in different age, totaling 160 individuals, plus 7 grown-up males. Two of these female groups occupied the previous rookery places of males (positions I and II on Fig. 2), situated on the beach in a reach of sea waves, and the third one has chosen the

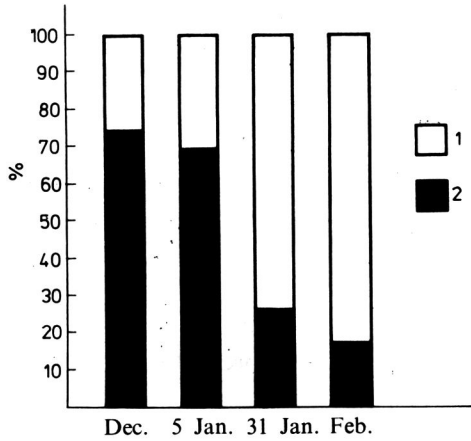


Fig. 3. The sex census of elephant seals population in Admiralty Bay
1 — females, 2 — males

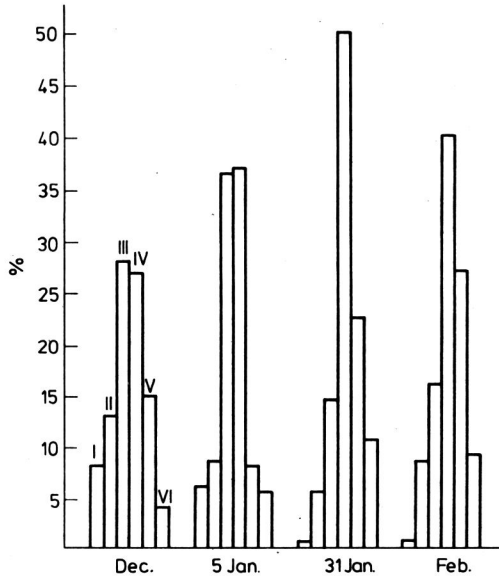


Fig. 4. Proportions of elephant seals age classes, acc. to Laws (1953)

place 80 m from the sea side. The distance to the sea has the influence on the activity of elephant seals. The individuals from the places closer to the sea descend to the water more often than seals from more distant colonies.

During the time spent on the coast the elephant seal takes a rest. The more intense is the activity of the colony, the less individuals can be found on the beach. Thus the number of seals found on the coast is a reciprocal measure of the activity of the colony (Müller-Schwarze 1965). It was estimated that the males were the most active in the morning

from 3.00 to 11.00 h, while the females — in the evening from 19.00 to 1.00 h (Fig. 5). On the Fig. 5 there is also shown an influence of weather on the behaviour of elephant seals (line nr 2 and 3). On the fair, sunny days the animals go to the sea less often than on cloudy, dark days with snow or rain falls.

The curve of activity of males of the coast group is presented on Fig. 6. There are four peaks of activity, higher about 15.00, 6.00 and 10.00 h and one lower at 19.00 h. There is also shown the special curve of fights frequency (broken line). The maxima of both curves coincide. Elephant seal male has the lowest activity in the darkest hours of the day, here between 23.00 and 2.00 h.

The curve of females activity is presented on Fig. 7. The four peaks of their activity were observed: two higher about 11.00 and 17.00 h and two lower about 1.00 and 7.00 h.

4. Discussion and conclusion

The elephant seal has some steady rookery places in the region of Admiralty Bay, but particular individuals may migrate from one to another.

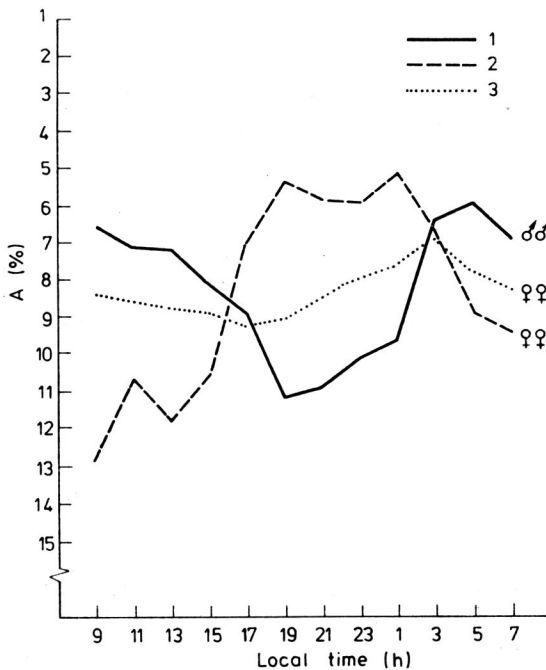


Fig. 5. Diurnal activity of elephant seals

1 — activity of males on cloudy days (based on 6 and 7 January 1979), 2 — activity of females on cloudy days (based on 2 and 7–9 February 1979), 3 — activity of females on sunny days (based on 4–6 February 1979)

Activity — A (%) — was measured as the percentage of individuals on the beach in relation to the total number of all individuals observed.

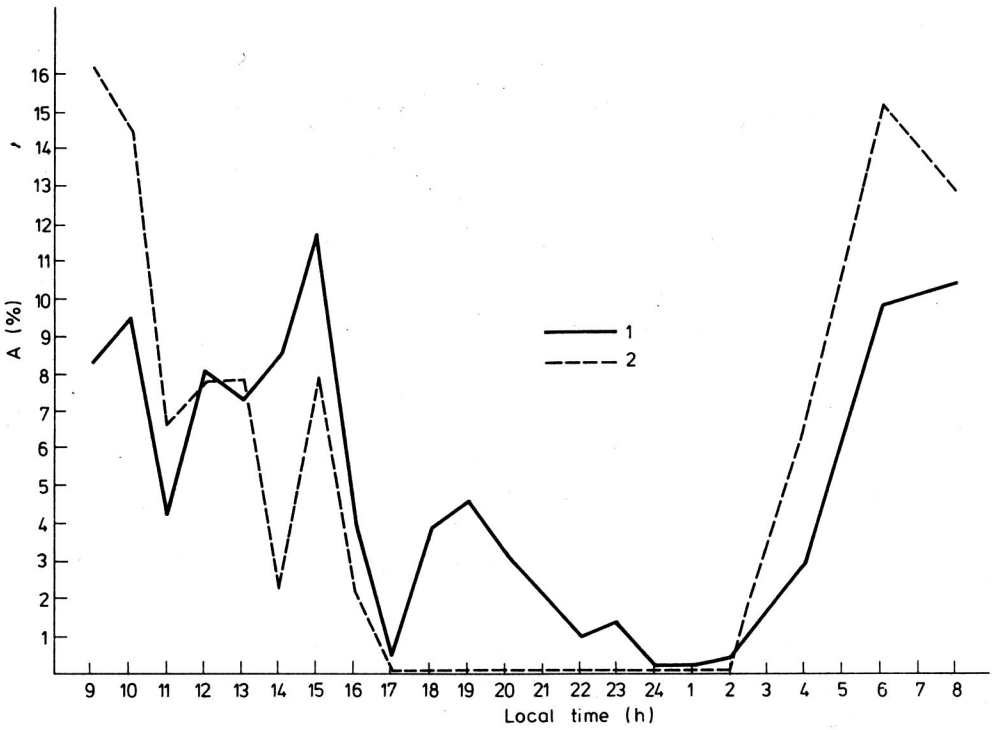


Fig. 6. Activity of males in the groups on the coast (1), and the frequency of flights (2)
Explanation see Fig. 5

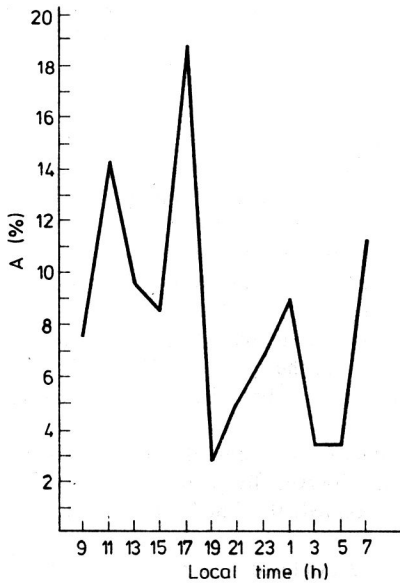


Fig. 7. Activity of females in the groups on the coast
Explanation see Fig. 5

This has been found by labeling experiments. The size of population systematically decreased during the research time. This is in an agreement with the data of Krylov and Medvedev (1972) and Popov and Krylov (1978) for the south-western part of King George Island.

The following conclusions can be drawn from the preliminary observations of activity of the elephant seal:

1. The elephant seals are active for the 24h of the day, but with changing intensity.

2. The activity is influenced by the type of weather. The animals are less active on fair, sunny days than on cloudy days with rain or snow falls. This observation is in accordance with Müller-Schwarze (1965) results concerning the weddel seal. This author proved that the greater is intensity of light, the smaller is activity of these seals.

3. The activity of elephant seal is influenced by a size of the colony and its distance to the sea. In the smaller and more distant colonies the activity of animals is less intense than in big colonies located closer to the sea. These results demand further investigation.

4. There was observed an interesting fact of time coincidence of two activity peaks of females on the coast, i.e. at 11.00 and 17.00 h with the peaks of frequency of copulations of northern elephant seal (*Mirounga angustirostris*) in the breeding colonies (Le Boeuf 1972). The behaviour of two species of elephant seal has much in common and is often compared (Laws 1956 a, Le Boeuf and Petrinovich 1974, Sandegren 1976). The above observations seem to confirm this resemblance.

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5. Summary

The observations of the numbers, distribution, age and sex structure and diurnal activity of the elephant seal (*Mirounga leonina*) in the moulting period were studied in the Admiralty Bay, King George Island, in summer 1978/1979. The censuses of the elephant seals in the whole region of the Bay were done on the 5 January and 10 February 1979. The first census resulted in 964 individuals, the second one — 639. The most numerous colonies were located at the mouth of the Bay (Fig. 1). The males amounted to 74% of all individuals in December, to 48% in January and to only 17% in February (Fig. 3).

The majority of seals belonged to the age classes III and IV (i.e. individuals 3—9 years old) during the period December-January, but the IV age class (6—9 years old) dominated decisively in February (Fig. 4).

An introductory observations on the diurnal activity were made. The highest frequency of descending to the sea was observed for males during 3⁰⁰—11⁰⁰ h, the same time the highest number of fights was observed; the females were the most active in period 19⁰⁰—1⁰⁰ h (Fig. 5).

Groups of males on the land exhibited four periods of an increased activity: a distinctive one about 15⁰⁰, 6⁰⁰ and 10⁰⁰, and a weaker one about 19⁰⁰ h (Fig. 6). Similar periods of an increased activity were noticed for females about 11⁰⁰ and 17⁰⁰ h, and the weaker one about 1⁰⁰ and 7⁰⁰ (Fig. 7). The weather seems to have an influence on the diurnal

activity. The elephant seals are more active on the cloudy days with the rain or snow falls than on the bright and sunny days (Fig. 5).

6. Резюме

Летом 1978/79 в Адмиральты Бей на Кинг Джордж Исланд были проведены наблюдения количества, расположения, возрастной и половой структуры а также сумочной активности южного морского слона (*Mirounga leonina*), в период линения. Подсчёт морских слонов во всём районе залива проведено 5 января и 10 февраля 1979 года. Во время первого подсчёта замечено 964 особи, а во время второго — 639 особей. Самки многочисленных колонии находились при устье залива (рис. 1). В декабре самцов было 74% всех особей, в январе 48%, а в феврале 17% (рис. 3).

В период декабря и января наиболее особей принадлежало к III и IV возрастным классам (т.е. особи в возрасте 3—9 лет) зато в феврале преобладал возрастной класс (6—9 лет) (рис. 4).

Проведено вступительные наблюдения суточной активности наибольшую носецаемость вхождения в воды замечено у самцов во время от 3⁰⁰ до 11⁰⁰ часов, в то же время замечено наибольшее количество боев, зато самки проявляли наибольшую активность в период от 19⁰⁰ до 1⁰⁰ часа (рис. 5).

В группах самцев пребывающих на суше замечено четыре периода повышенной активности: выразительный около 15⁰⁰, 6⁰⁰ и 10⁰⁰ часов, а также более слабый около 19⁰⁰ часа (рис. 6). У самок похоже периода повышенной активности замечено около 11⁰⁰ и 17⁰⁰ часов и более слабые около 1⁰⁰ и 7⁰⁰ часов (рис. 7).

Кажется что большое влияние на суточную активность имеет тип погоды. В дни пахмурные с осадками дождя или снега морские слоны проявляют большую активности, чем в ярые, солнечные дни (рис. 5).

7. Streszczenie

Latem 1978/1979 w Zatoce Admiralicji na Wyspie Króla Jerzego przeprowadzono obserwacje nad liczebnością, rozmieszczeniem, strukturą wiekową i płciową, oraz aktywnością dobową południowego słonia morskiego (*Mirounga leonina*), w okresie linienia. Liczenie słońi w całym rejonie Zatoki przeprowadzono 5 stycznia i 10 lutego 1979 r. W czasie pierwszego liczenia zanotowano 964 osobniki, a w czasie drugiego — 639 osobników. Najliczniejsze kolonie znajdowały się przy ujściu Zatoki (rys. 1). W grudniu samce stanowiły 74% wszystkich osobników, w styczniu — 48%, a w lutym tylko 17%. (rys. 3).

W okresie grudzień—styczeń najwięcej osobników należało do klas wiekowych III i IV (tj. osobniki w wieku 3—9 lat), natomiast w lutym zdecydowanie dominowała klasa wiekowa IV (6—9 lat) (rys. 4).

Przeprowadzono wstępne obserwacje nad aktywnością dobową. Największą frekwencję schodzenia do wody notowano u samców w godz. 3⁰⁰—11⁰⁰, w tym też czasie notowano największą ilość walk, natomiast samice były najbardziej aktywne w godz. 19⁰⁰—1⁰⁰ (rys. 5).

W grupach samców przebywających na lądzie zaznaczają się cztery okresy wzmożonej aktywności: wyraźnie ok. godz. 15⁰⁰, 6⁰⁰ i 10⁰⁰ oraz słabszy ok. godz. 19⁰⁰ (rys. 6). U samic podobne okresy wzmożonej aktywności notowano ok. godz. 11⁰⁰ i 17⁰⁰ i słabsze ok. godz. 1⁰⁰ i 7⁰⁰ (rys. 7). Duży wpływ na aktywność dobową wydaje się mieć typ pogody. W dni pochmurne z opadami deszczu lub śniegu słonie morskie są bardziej aktywne niż w dni jasne i słoneczne (rys. 5).

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