

P. B. Khojetskyy*

National Forestry University of Ukraine, 103 General Chuprynka Str., Lviv, 79057, Ukraine
State Institution National Antarctic Scientific Center, Ministry of Education and Science of Ukraine,
16 Taras Shevchenko Blvd., Kyiv, 01601, Ukraine

* Corresponding author: khojetskyy@gmail.com

THE REPRODUCTION OF THE WEDDELL SEAL *LEPTONYCHOTES WEDDELLII* (PHOCIDAE) IN THE WATERS OF THE ARGENTINE ISLANDS ARCHIPELAGO

ABSTRACT. Objective. The study of *Leptonychotes weddellii* (Phocidae) reproduction in the waters of the Argentine Islands archipelago. **Methods.** The inventory of Weddell seals was carried out on the islands of the archipelago by the route method with an inspection of the places where seals are likely to be located. Moving to the islands, depending on the ice situation, the weather conditions, was carried out on the sea ice or using a boat. The identification of *L. weddellii* was carried out in accordance with common methods. **Results.** In September—October 2015, in the waters of the Argentine Islands archipelago, five breeding sites of *L. weddellii* were revealed. At the first site (the Three Little Pigs Islands), five parturition cases were identified, at the second one (near the old English station), the births of 4 seal pups were recorded, at the third one (the Forge Islands) — 4 pups, at the fourth one (the Black — Leopard Islands) — 8 pups, and at the fifth breeding site (Grotto — Corner — Uruguay Islands) — 11 seal pups. The sixth site was probably the Barchans Islands. During the period of the study, over 76 % of the female seals with offspring and about 24 % without seal pups were recorded. Observations indicate that females swim in advance into the water of the archipelago for further reproduction. It was found that in six females parturitions occurred a day after their appearance on the island's shore or the ice cover, some females brought pups four, six and seven days later. During September — October 2015 more than 50 % of females gave birth to pups on the ice cover, but at the distance which did not exceed 10—15 m from the shore. The births of pups at a considerable distance from the shores of the island were recorded rarely. **Conclusions.** In the spring of 2015, the first female seal at birth was recorded in early September, the last one — in the second ten-day period of October, the maximum number of parturition cases was found in the third ten-day period of September. The breeding period lasted 38 days. There were recorded 32 female seals that gave birth to 18 male pups and 14 female pups. The number of seal pups was higher than in previous years, there was no postnatal mortality and no mortality of young animals was recorded. Our studies provide an opportunity to estimate the size and structure of the species population in the waters of the Argentine Islands archipelago. However, some issues of Weddell seals biology in the period of breeding need further study, in particular: spatial-temporal distribution, emigration and immigration processes in the area of the archipelago, which are related to the ice situation, the availability of feed and reproduction.

Keywords: *Leptonychotes weddellii*, reproduction, numbers, Argentine Islands, Antarctica.

INTRODUCTION

The Weddell seal (*Leptonychotes weddellii* Lesson, 1826) is the most common species of seals in Antarctica. The number of the population is about 900 thousand individuals (Bastida and Diego, 2009). The

first publications on the ecology of the species appeared at the beginning of the last century. Detailed research began in the second half of the twentieth century with the establishment of Antarctic stations in Antarctica. The Weddell seal has been the object of study by many researchers (Dykyy, Drongovska, 2015; Burns, 1999; Burns et al., 1999; Burns et al., 1998; Gelatt et al., 2010; Negri et al., 2016; Reijnders

et al., 1990; Schreer et al., 1996; Stirling, 1972; Testa, 1994; Testa and Siniff, 1987; Thomas and DeMaster, 1983; Vaughan, 1968). Numerous publications are devoted to the vital activities of the species in different regions of the sub-Antarctica and Antarctica (Dyky, Salhanskyi, 2013; Lake et al., 2003; Pahl et al., 1997; Stirling, 1969; Thomas and DeMaster, 1983). In particular, fundamental studies were conducted in East Antarctica, on the islands of South Georgia, South Orkney and the Shetland Islands (Bartsh, et al., 1992; Casaux et al., 1997; Lake et al., 2008; Stirling, 1972; Testa and Scotton, 1999; Vaughan, 1968). In the late 20th century, Weddell seal's reproduction was studied on the eastern coast of the Antarctic Peninsula, on the shelf glacier of Larsen (Reijnders et al., 1990). At the beginning of the 21st century, the Weddell seals biology studies was continued by scientists from different countries (Cameron and Siniff, 2004; Dyky, Drongovska, 2015; Gelatt et al., 2010; Lake et al., 2003; Negri et al., 2016; Salganskiy, Dyky, 2013; Sato et al., 2002; Terhune, 2008; Van Polanen Petel et al., 2007).

The biologists conducted substantial research on biotic diversity of the Argentine Islands and adjacent territories of the Antarctic Peninsula (Graham Land) during 1996—2016 at the Ukrainian Akademik Vernadsky station. However, the Weddell seals biology and ecology had not received a proper attention (Dyky et al., 2012).

Publications by Ukrainian scientists were concerned with daily and seasonal migrations, the peculiarities of the growth of young Weddell seals, the feeding of Antarctic species of seals, etc. (Dyky, Drongovska, 2015; Dyky, 2009; Dyky, 2012; Dyky, Drongovska, 2015; Drongovska, Dyky, 2016; Dyky, Salganskiy, 2013; Salganskiy, Dyky, 2013). However, the study of the features of Weddell seals breeding in the Graham Land of the Antarctic Peninsula is absent. Therefore, there is a need to monitor certain aspects of reproduction of seals in the waters of the Argentine Islands Archipelago.

MATERIALS AND METHODS

Field data was collected during the period of September – October 2015 within at the Argentine Islands

Archipelago in accordance with the objectives of the State Special Purpose Research Program of Ukraine in Antarctica for 2011—2020. The archipelago is located between 65°13'—65°16' S and 64°10'—64°20' W in the Pacific sector of the Antarctica. Within the archipelago there are 15 islands and a significant number of surface rocks. The islands chain stretches from the south-west to the north-east along the Graham Land of the Antarctic Peninsula. On one of the islands (Galindez Island) the Ukrainian Akademik Vernadsky station is located.

The identification of parturition sites and recording of Weddell seals in the waters of the archipelago were carried out by the route method. On the routes that were laid to the islands of Uruguay, Black, Leopard, Forge, Three Little Pigs etc. we examined the probable places of seal breeding. We climbed to the highest point of the islands (Galindez, Skua, Uruguay) with the purpose of exploring with optical instruments the archipelago's water area to identify animals. The ventral part of the body (belly, chest) was photographed in all registered seals. Moving to the islands, depending on the ice situation, the weather conditions, was carried out on the sea ice or using a boat. Each individual has a unique pattern of the lower part of the body which does not repeat itself (Dyky, Drongovska, 2015). The taken photographs of animals made it possible to identify individuals by natural markers (ventral part figure), to track their migration routes, to compare photographs of Weddell seals findings during April-August 2015. The birth of seal pups was attested indirectly by the behavior of birds. At the parturition sites of female Weddell seals, clusters of birds were usually recorded, sometimes the feathers of the birds (*Larus dominicanus*, *Chionis alba*) were covered with blood because of eating the placenta.

The weather conditions in September 2015, steady ice cover in the channels of Meek Shannel, Skua Creek, and Stella Creek allowed examination not only of the islands of Skua, Winter, Grotto, Three Little Pigs, which are located near the Ukrainian Antarctic station, but also made it possible to move to the islands of Forge, Uruguay, etc. The passage to the islands was carried out on the sea ice with the observance of safe-

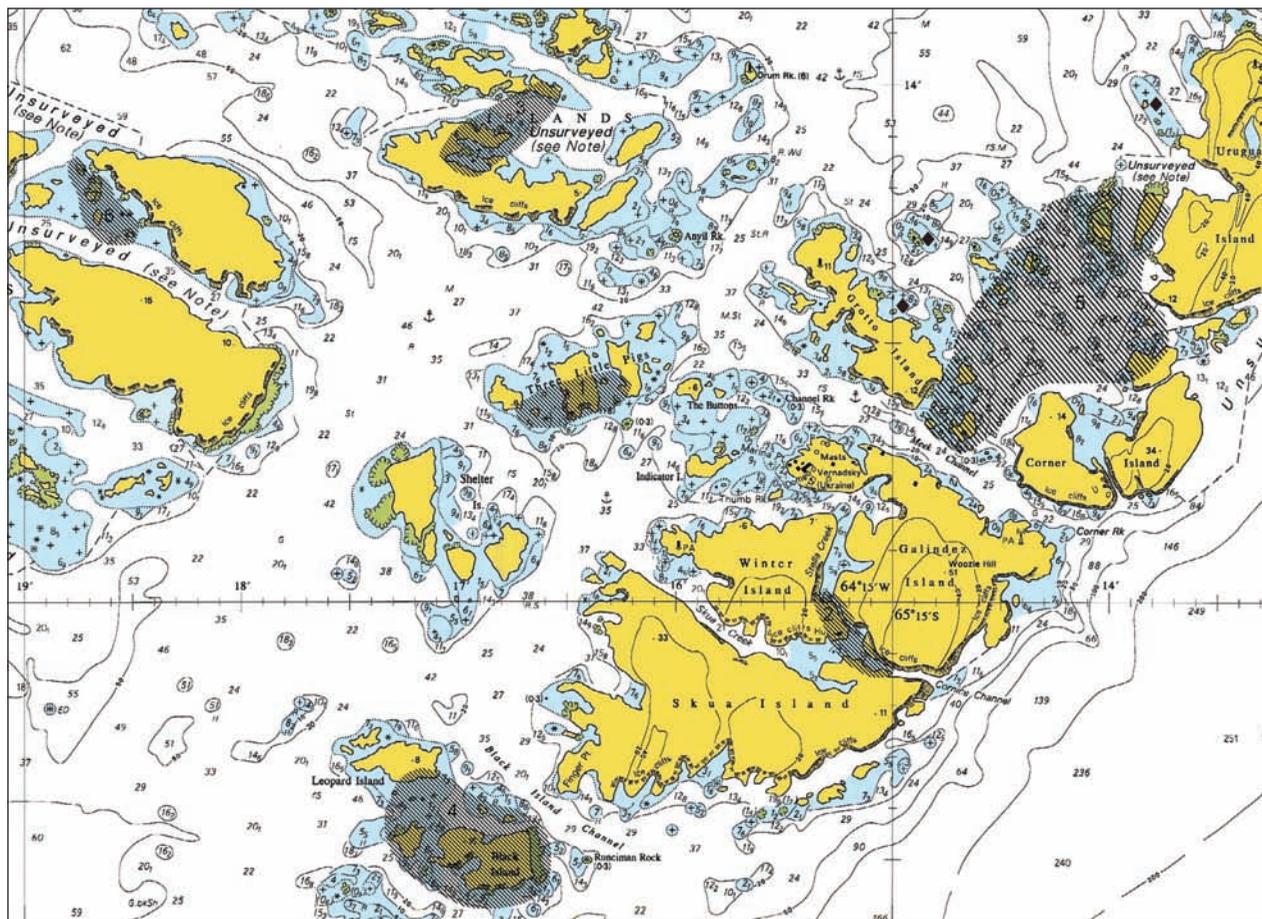


Fig. 1. Breeding sites of *Leptonychotes weddellii* (1, 2, 3, ... — breeding site No., \diamond — seal appearance location)

ty. Only at the end of September, as a result of warming, the ice cover was not stable, that restricted access to some islands of the archipelago. Sometimes, depending on the ice situation, a boat was used to access the breeding points.

RESULTS AND DISCUSSION

In August, within the archipelago, the Weddell seal population was small. Only 12 cases of the animals' occurrence were recorded. In six cases, it was not possible to take photograph of the animals for further identification. The individuals were in the water or in potentially dangerous and inaccessible places. The gender of four individuals was identified (two males, two females). One female and one male were record-

ed twice in August, while the other male was repeatedly seen in the waters of the archipelago in the months that followed (September – November). Unlike August, Weddell seal population increased substantially in September due to the beginning of breeding season. In September, within the archipelago a stable ice cover was formed which influenced the selection of sites by females for giving birth. Totally five reproductive areas were recorded (Fig. 1). The first breeding area was located on the Three Little Pigs Islands. The first case of parturition was recorded on September 9, at a temperature of $-13-17^{\circ}\text{C}$, with the southwestern wind blowing. Around 11hrs.30 min, in the sunny weather, a female was discovered on the ice near the south-eastern coast of the middle island of group of the Three Little Pigs Islands. Ap-

proximately two hours later parturition occurred. After 2 pm, more than 30 Dominican gulls (*Larus dominicanus*) and four snowy sheathbills (*Chionis alba*) were recorded near the female. The birds were eating the placenta. The female was aggressive actively attacking the birds, driving them away from the pup. The observation of the female seal with the pup (family No. 1) was resumed on the following days. September was characterized by bad weather conditions. Often poor visibility, snow did not always provide the opportunity to thoroughly observe the seals. However, within ten days the pup was not left by the female. Only on September 19, in the morning, the pup was found alone. The female was in the ocean and appeared after 12.00 hrs. The next day, female had dived into an ice-hole five times and climbed on the ice, provoking the pup to get down into the water.

Observations indicate that females swim in advance into the water of the archipelago for further reproduction. On the morning of September 13, at a distance of 15–20 m from the first family (the middle island of the Three Little Pigs Islands), a pregnant female seal was found at rest. It was here until about 19.00. During the following days (September 14–16), the female seal was again recorded near southern and middle islands of the Three Little Pigs Islands. Three days later (September 19), there was parturition (family No. 3). On September 25, on the Three Little Pigs Islands, a seal was noticed to be at a distance from the pup, not trying to get closer to it. As a rule, all newborns are in close proximity to females, not moving away from them. The behavior of the pup was balanced; it did not try to get closer to the seal. On detailed reviewing the photographs, it was established that the seal, which was near the pup, was not the female who had given birth to it. Probably the mother was feeding in the ocean at that time, but in its absence another female, who had previously been recorded in the archipelago, in particular on June 13, 2015 at Cape Pigeon Point (Galindez Island), climbed onto the rock.

Birds have always been around seals during the breeding season. Thus, on September 19, during the parturition of two females (families 4 and 5), four Dominican gulls, two snowy sheathbills, and one gi-

ant fulmar (*Macronectes giganteus*) were found on northern island of the Three Little Pigs Islands. The females were on the shore of the island at a distance of 10–15 m apart.

In the second half of August 2015, at temperatures below –200 °C, a stable ice cover was formed in the archipelago waters, sometimes with small ice-holes. During September, the area of the ice-holes got reduced in the case of temperature dropping or slightly increased with increasing temperature. However, in the first decade of October, the ice situation around northern and middle Islands (of the Three Little Pigs Islands) has changed. As a result of warming, sometimes a large area got free from the ice and significant ice-holes appeared. Therefore, the seals could not use the ice to rest, and, due to the snow driven during the winter, it was difficult for animals to climb onto the shores of the islands, and sometimes it was not possible at all. The ice between middle and northern islands of the Three Little Pigs Islands was the place of the permanent lair for family No. 1. The change in the ice situation caused the migration of the females with pups to other parts of the archipelago. The female with the pup (family No. 1) was last seen near the Coast of Middle Island of the Three Little Pigs Islands on 5 October, and on October 6, they were discovered in the Stella Creek between Galindez Island and Winter Island. They remained here until October 8. From 12 to 18 October, the family was recorded in the water area between the islands of Grotto – Corner – Uruguay (breeding site 5). After October 18, they were not found within the archipelago. Probably, at the beginning of the second decade of October, the animals left the Three Little Pigs Islands – the Indicator of families 3, 4 and 5. Later they were not seen in the waters of the archipelago. Only family No.12 that was near southern island (Three Little Pigs Islands), which was covered with ice, was seen until November 12.

It was found that within the archipelago the beginning of the birth of seal pups was recorded in the first or second decade of September. The breeding season in previous years ranged from 24 to 31 days. The whelping season 2015 was lasted for 38 days. In comparison to the studies conducted in the 1990s, the reproduction season

of Weddell female seals on the East Antarctica lasted about 40 days (Reijnders et al., 1990).

In September 2015, within the archipelago, the following parturitions were recorded two days later in the second breeding area – September 11 (Table). A pregnant female seal was found the day before (September 10) on Skua Island opposite the old English station (Wordie House) located on the Winter Island. Here on the shores of Skua, Winter and Galindez Islands, at the junction of the straits of Skua Creek, Cornic Channel, Stella Creek, seals reproduce annually. The reproduction of the Weddell seal in this part of the archipelago was noted by the biologists of the previous expeditions.

Unlike the first female, whose parturition took place on September 9 and which gave birth to a pup on the ice near the shore, the second female moved ashore from the ice-hole at a distance of 10 m. Usually, the seals climbed on the ice-field or the shore of the island from ice-holes or cracks that were formed as a result of tidal phenomena between the shores of the islands and the ice-field, which made it easy for the animals to climb out of the water. During September – October 2015 more than 50 % of females gave a birth to pups on the ice cover, but at a distance which did not exceed 10–15 m from the shore. The births of pups at a considerable distance from the shores of the island were recorded rarely. In particular, in spring 2013, out of 13 recorded cases of parturition only one female calved down at a distance about 100 m from the nearest shore of the island (pers. comm. biologist M. Veselsky). In general, the choice of place of birth depends on the ice situation formed during the period of reproduction.

The observation of the female with the pup (family No. 2) was conducted during the following days. During the period of 13–17, 24–27, and on September 30 the female was near the newborn, but on September 28, the pup was on Skua Island without the female until approximately 18.00. During the study period, the family did not change the place of dislocation and was constantly on the second parturition site, the family was last recorded on October 3 on the ice-field of the Cornic Strait, and then it disappeared in an unknown direction.

However, in the Stella Creek, on September 28, 2015, two females (family No. 15, 16) were recorded; whose parturitions took place two days later — on September 30. Also, two days later (October 3rd), the parturition in the female (family No. 17), which was found here on October 1, took place. In general, in September, reproduction in 15 females was analyzed. It was found that in six females parturitions occurred a day after their appearance on the island's shore or the ice cover, some females brought pups four, six and seven days later (Fig. 2). Two females had parturitions on the first day. The coloration of newborn seals is of light gray color with an admixture of yellow-rusty tones on the belly and sides. Sometimes the pups have a greenish tint coat, which subsequently disappears.

Until October 13, the females with the pups did not come down into the water, but on October 16, family No.16 was not found in the Stella Creek, and family No.15 was recorded near the northern shore of Galindez Island. Family No.15 was characterized by significant activity. The family did not appear in the Stella Creek after October 16, but was discovered near the island of Grotto on October 19. Here, in the waters of the islands Grotto – Corner – Uruguay, the family's live activity was recorded on 23, 25–28 and 30 October. For the last time, the family was observed in the water area of the archipelago on November 2. The other two families stayed in the Stella Creek – during October and early November. Here, in November, family No.17 was last registered on November 7 and family No.16 – on November 11.

Table. *Leptonychotes weddellii* seal parturition sites in the waters of the Argentine Islands Archipelago (September – October 2015)

Breeding site	Location	Number of families	Family No.
1	Three Little Pigs	5	1, 3, 4, 5, 12
2	Skua – Winter – Galindez	4	2, 15, 16, 17
3	Forge Island	4	6, 29, 30, 32
4	Black – Leopard	8	7, 8, 9, 13, 14, 27, 28, 31
5	Grotto – Corner – Uruguay	11	10, 11, 18, 19, 20, 21, 22, 23, 24, 25, 26

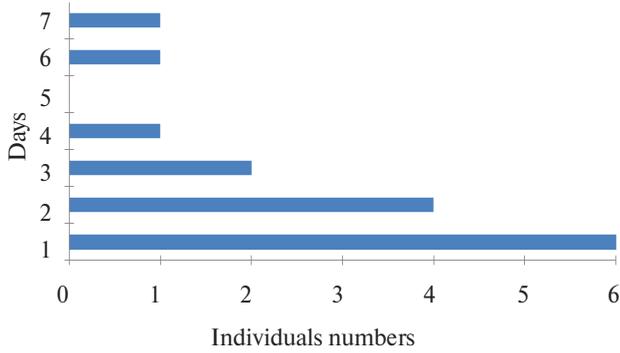


Fig. 2. Duration of stay of *Leptonychotes weddellii* females in breeding sites before the birth of seal pups

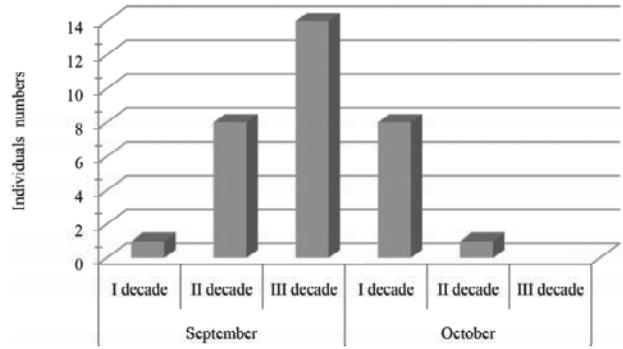


Fig. 3. Recording of *Leptonychotes weddellii* females parturition in the waters of the Argentine Islands Archipelago in September – October, 2015

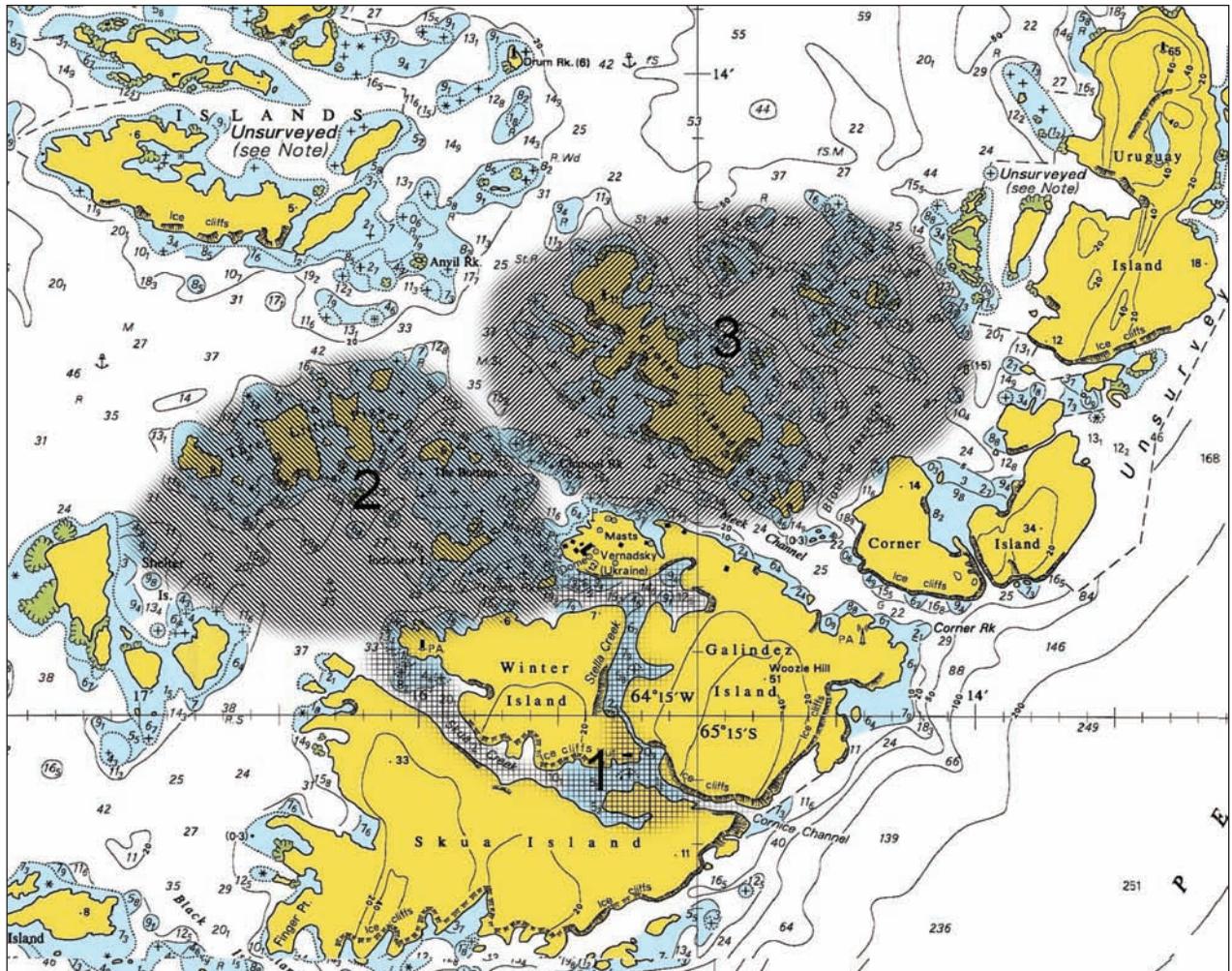


Fig. 4. Distribution of *Leptonychotes weddellii* males in the waters of the Argentine Islands Archipelago (1, 2, 3 – male No.)

The third breeding site of Weddell seals was formed on the Forge Islands. On September 19, as a result of a detailed survey of the archipelago's water area, a female with a pup (family No. 6) were recorded on Forge Island. The female, like most female seals before parturition, actively moved along the ice-field and the shore of the island (approximately within a distance of 20–30 m). Many traces of Dominican gulls, giant fulmars were found near the place of parturition. The parturitions of the other three females (No. 29, 30, 32) took place in the first decade of October in the Forge Islands Bay.

The next area of seal breeding was Black Island and Leopard Island. For the first time, a female was found on September 15. The animal was observed from the highest point of Skua Island using optical devices on September 16, 18 and 19. The parturition occurred probably in the evening on September 19 on the eastern coast of Black Island (family No. 7), and the next day (September 20), the birth of two seal pups was observed near the Black Island (families No. 8 and 9). After surveying the islands and detecting females with pups, a comparative analysis of families from other islands was conducted by photo materials. It was found that the females with pups identified near the Black Island and the Leopard Island had not been previously encountered in the archipelago waters. In general, in the waters of Black and Leopard islands, out of 8 females five gave birth to pups in the third decade of September (families 13, 14, 27, 28, 31). Overall, in the third decade of September, more than 40 % of all newborn seals were recorded (Fig. 3).

In the second decade of September, as in the first decade of October, parturitions were recorded in 25 % of females. Only one female's parturition was revealed in the first decade of September and one in the second decade of October. In Antarctica, the breeding season of seals is long and depends, in most cases, on territorial affiliation. In the subarctic zone the breeding season begins in August, in the south near the Antarctic coast – in October.

Overall, during the study period in the waters of the archipelago, the gender was identified by 32 pups, the sex ratio was as follows: 1.3♂♂ : 1♀♀. In no case

was registered the birth of twins, nor was there post-natal mortality of pups. In previous years, there were cases of post-natal death and death of youngsters.

The largest (fifth) breeding site of seals is located between the islands Grotto – Corner – the southwestern part of the Uruguay Island. The water area near the southeastern part of Grotto Island is characterized by insignificant depth, the presence of underwater and surface stones, which led to the rapid warming of water and formation of ice-holes at the end of September, convenient places for seals moving onto the ice surface and the shore of the island. Female seals were repeatedly recorded here, namely, on September 13, 18, 21. Therefore, Grotto Island was the object of constant observation and on September 23, after the registration at the Antarctic station buildings a Dominican gull, whose feathers on its chest were covered with blood, a thorough inspection of the water area at the southeastern part of Grotto Island revealed two females with newborn pups (families 10 and 11).

At the beginning of October, there were seals recorded near the western coast of Corner Island. On the ice, near the shore of the island, at a slight distance from one another, there were three females with pups; the fourth of the seals was on the island (families 18–21). Unlike other parts of the area, where seals form a group of dozens of females, in the water area of the archipelago, in the parturition sites, the largest number was 3–4 females locating at a distance of 5 to 80 m from each other.

In October, near the western coast of Uruguay Island, three females with pups were recorded (families 23–25). The lairs, the appearance of the pups, further occurrence of the seals in the places of their registrations indicate that the birth took place in the vicinity of Uruguay Island. One of the three females was first discovered on September 21 near the southeastern part of the Grotto Island. During October 14–17, the female and pups (family No. 23) was observed near the western coast of Uruguay Island. They actively moved in the water area of the archipelago on 19–23 and 25 October: on October 19–20, they were discovered in the Meek Channel, on 21–23 and 25 October – on the ice of the Stella Creek. For the

last time in the area of the archipelago, they were recorded in the fifth breeding site on November 7. 46 days have passed from the first to the last recording of the female in the water area of the archipelago. The analysis of the duration of stay (from the birth of the pup to the last recording in the water area of the archipelago) of 11 females with pups indicates that they were in the water area for an average 39.9 ± 1.9 days ($p < 0.05$).

The last parturition of seals in the area of the archipelago was found on a small, unnamed island, located to the north of Grotto Island. On this island, on October 12, a female with a pup was found; judging by the appearance of the pup, it was established that the birth took place in early October. Another pregnant female was recorded here on October 13 and 15 on the ice near the island. The examination of the breeding site on October 17 showed that the parturition took place on October 16 in the interval from 21.00 hrs. to 24.00 hrs.

Overall, during the study period (September-October 2015), 32 female seals with pups, seven males and 10 females, which were not involved in reproduction, were recorded in the archipelago's water area.

Starting from the second decade of October, females with pups were actively moving in the waters of the archipelago between the breeding sites, concentrating near the ice-holes. The basis of such groups was the young and females that brought the offspring here, and at the end of October – in early November – the offspring of the current year of birth. In such groups the pups were staying for several days, waiting for the females. In addition to the groups being within the breeding sites, there were also groups that were resting around ice-holes outside the breeding sites; these groupings consisted not only of females with pups, but also males and other females who did not participate in reproduction.

Males much less frequently occurred in the waters of the archipelago. For the first time, a male (No. 1) was found on September 19 on northern island of group of the Three Little Pigs Islands. For the second time, it was recorded on September 24 in the Stella Creek (near the Wordie House), and one more time – on September 27 and 30, not far from the strait on the northern coast of Skua Island. In October, it was

seen again: on October 10 (near the southern coast of Skua Island) and on October 19 again in the Stella Creek near Galindez Island, and for the last time – on November 13 and 15.

A certain territoriality was observed in the distribution of males in the area of the archipelago (Fig. 4). Unlike the previous male, another male (No. 2) was recorded in the water area of the archipelago for the first time on August 15 on the east coast of Galindez Island, and on August 27 – on the Three Little Pigs Islands. Until the third decade of September, it was not found in the archipelago. But in September, the male's resting places were the Three Little Pigs Islands (it was seen there three times). In October, due to a change in the ice situation, the disappearance of ice near the Three Little Pigs Islands, the male's resting places were the ice-field between Winter Island and Galindez Island (8, 14 October) and Thumba Rock (11, 23 October). For the last time, it was recorded on November 5 on the ice between Shelter Island and the Three Little Pigs Islands.

Prolong staying in the water while searching the food, migrations, exhaust seals, so usually their resting period is long, sometimes – several days. However, observations showed that the length of rest of male No. 2 was relatively short: October 8 – from 12.00 hrs. up to 18 hours 45 min, October 11 – from 12 hrs. 30 min up to 16 hrs. 45 min. According to literary sources, Weddell seal mating occurs after a lactation period, approximately in November. Adult males in this period are characterized by sexual activity. However, the first display of activity was recorded in September. Thus, on September 20, at 12 hrs. 10 min, a seal climbed onto the shore of Middle Island of the group of Three Little Pigs Islands; 10 minutes later, another seal climbed out of an ice-hole and began to pursue the first individual. After two non-prolonged fights, the second seal returned to the ocean at about 12 hrs. 45 min and the first crept through the entire island and stopped about 20–25 m from the shore. The seal turned out to be a female without signs of pregnancy.

Overall, in October, in addition to the above-mentioned two individuals (males No.1 and No. 2), five more males appeared in the water area of the archipelago, three of which were two- or three-year-old

young individuals and two of which were adult individuals. The period of two young males' stay in the water area of the archipelago was probably not long, they were seen only once. The third young male lingered for a longer time; its activities were recorded for about a week, but on the periphery of the archipelago.

Of the two adult males, only one (No. 3) was constantly seen in October and November (it was last seen on November 24). Its locations were different from the previous adults' (males No.1 and No. 2), namely, the water area near Grotto Island, the Meek Channel (between Grotto Island and Galindez Island). A kind of a fight between male No.3 and another unknown one (possibly No. 2) was recorded on October 17 near Galindez Island. After the fight, the movement of one seal towards the Stella Creek was traced, and the other one climbed onto the ice near Grotto Island. The seal stayed here until about 16:00.

The second adult male was on the ice surface near the east coast of Skua Island from 10 to 12 October. Several shallow wounds were found on the abdominal region of the seal. However, males with wounds were first recorded already in September. Thus, on September 21, on the belly and the neck of male No. 2 there were numerous shallow wounds, and on October 10, shallow bites on the body of male No.1 were detected. The male with wounds was last recorded on December 3.

In November, the number of males increased. During November, there were 24 registrations of 15 males, of which males No. 1—4 were found at rest eight times, eight males were recorded only once, two males – twice and one stayed in the water area for about a week. About half of the individuals had shallow wounds on the bodies. Thus, during the study period, a permanent stay in the waters of the archipelago of three males (No. 1, 2, 3) was reliably established.

CONCLUSIONS

During September – October 2015, five breeding sites were discovered in the waters of the Argentine Islands Archipelago. The parturitions of five females were identified in the first breeding site (the Three Little Pigs Islands), in the second one (around the old English base) the births of four pups were recorded,

in the third breeding site (The Forge Islands) – four births of pups, in the fourth one (Black Island – Leopard Island) – eight pups, in the fifth one (the islands of Grotto – Corner – Uruguay) – 11 pups. In total, parturitions of 32 females were recorded, which resulted in 18 male pups and 14 female pups. The sixth breeding site was probably the Barchans Islands.

Throughout the study period (September – October 2015), because of the bad weather conditions and potentially dangerous places, it was not possible to inspect the Barchans Islands, later on seal pups were found there, but at the age when they were already able to make independent movements, therefore, it was not possible to identify their place of birth.

Within the archipelago, a female's parturition was first recorded in the first decade of September, for the last time – in the second decade of October; the maximum number of births was recorded in the third decade of September. The duration of the breeding season for Weddell seals in the waters of the archipelago was 38 days. Over the period of the study, over 76 % of females with the offspring and about 24 % – without seal pups were recorded. The number of females was 6 times higher than that of males. The number of males in the area of the archipelago increased from September to November (from 2 to 15 individuals), but during the period of the studies, three males were continuously recorded in the area of the archipelago, while others did not stay in the archipelago's waters for a long time.

In general, the reproduction of Weddell seal females in the waters of the Argentine Islands Archipelago in spring 2015 was successful. The number of seal pups was higher than in previous years, there was no postnatal mortality and no mortality of young animals was recorded.

Our studies provide an opportunity to estimate the size and structure of the species population in the waters of the Argentine Islands Archipelago. However, some issues of Weddell seals biology in the period of breeding need further study, in particular: spatial-temporal distribution, emigration and immigration processes in the area of the archipelago, which are related to the ice situation, the availability of feed and reproduction.

Acknowledgements. *The author is grateful to the State Institution National Antarctic Scientific Center of Ukraine for financial and logistic support of conducted research.*

REFERENCES

1. Bartsh, S. S., Johnston, S. D., Siniff, D. B. 1992. Territorial behavior and breeding frequency of male Weddell seals (*Leptonychotes weddellii*) in relation to age, size, and concentrations of serum testosterone and cortisol. *Canadian Journal of Zoology*, 70 (4), 680–692.
2. Bastida, R., Rodriguez A. C. 2009. *Marine mammals of Patagonia and Antarctica*. Buenos Aires: Vazquez Mazzini Editores.
3. Burns, J. M. 1999. The development of diving behavior in juvenile Weddell seals: pushing physiological limits in order to survive. *Canadian Journal of Zoology*, 77 (5), 737–747.
4. Burns, J. M., Castellini, M. A., Testa, J. W. 1999. Movements and diving behavior of weaned Weddell seal (*Leptonychotes weddellii*) pups. *Polar Biology*, 21, 23–36.
5. Burns, J. M., Trumble, S. J., Castellini, M. A., Testa, J. W. 1998. The diet of Weddell seals in McMurdo Sound, Antarctica as determined from scat collections and stable isotope analysis. *Polar Biology*, 19, 272–282.
6. Cameron, M. F., Siniff, D. B. 2004. Age-specific survival, abundance, and immigration rates of a Weddell seal (*Leptonychotes weddellii*) population in McMurdo Sound, Antarctica. *Canadian Journal of Zoology*, 82 (4), 601–615.
7. Casaux, R., Baroni, A., Carlini, A. 1997. The diet of the Weddell seal *Leptonychotes weddellii* at Harmony Point, South Shetland Islands. *Polar Biology*, 18, 371–375.
8. Drongovska, M., Dykyy, I. 2016. Diurnal and seasonal migration of Weddell seals (*Leptonychotes weddellii*) on the territory on Argentine Islands Archipelago. Int. con. “*Youngth and Biology progress*”, Kyiv, 19–21 April, 215–216.
9. Dykyy, I., Drongovska, M. 2015. Diurnal and seasonal migration of Weddell seals (*Leptonychotes weddellii*) in the region of the archipelago of Argentina Islands (Western Antarctic). *Antarctic research: New horizons and priorities. VII International Antarctic Conference IAC 2015*. Kyiv, Ukraine, May 12–14, 2015, 54–55.
10. Dykyy, I. V., Dronhovska, M. O. 2015. Dobovy ta sezonny myhratsii tyuleniv Ueddella (*Leptonychotes weddellii*) v raiony arhipelahu Arhentynskyi ostrovy (Zakhidna Antarktyka) [Daily and Seasonal Migrations of Weddell seals (*Leptonychotes weddellii*) in the archipelago of the Argentine Islands (Western Antarctica)]. *Ukraynskyi antarktychnii zhurnal* [Ukrainian Antarctic Journal], 14, 158–162.
11. Dykyy, I. V., Salhanskyi, O. O. 2013. Osoblyvosty rostu molody tyuleniv Ueddella (*Leptonychotes weddellii*) [Features of youth growth of Weddell seals (*Leptonychotes weddellii*)]. *Ukraynskyi antarktychnii zhurnal* [Ukrainian Antarctic Journal], 12, 258–264.
12. Dykyy, I. 2012. The feeding peculiarities of the Antarctic seals in the region of the archipelago of Argentina Islands. *Document CCAMLR/NºWG-EMM-12/P1*, 8 June, 2012, 1–9.
13. Dykyy, I. 2009. The feeding peculiarities of the antarctic seals in the region of the archipelago of Argentina Islands. *Ukrainian Antarctic Journal*, 8, 215–223.
14. Dykyy, I., Tsaryk, Y., Shydlovskyy, I., Trokhymets, V., Holovachov, O. 2011–2012. Cenotic connections land biota Islands Western Antarctic. *Ukrainian Antarctic Journal*, 10–11, 239–256.
15. Dykyy, I., Utjevskiy, A., Trochymets, V. 2012. Biotychno ryznomanyttia arhipelahu Arhentynskyi ostrovy (Zakhidna Antarktyka) [Biological diversity of the archipelago of the Argentine Islands (Western Antarctica)]. *Dynamika bioryznomanyttia 2012: Zb. nauk. prats. Luhansk: DZ «LNU imeny Tarasa Shevchenka»*, 29–33.
16. Gelatt, T.S., Davis, S. Corey, Stirling, I., Siniff, D.B., Strobeck, C., Delisle, I. 2010. History and fate of a small isolated population of Weddell seals at White Island, Antarctica. *Conservation Genetics*, 11, 721–735.
17. Lake, S., Burton, H., Barker, R., Hindell, M. 2008. Annual reproductive rates of Weddell seals in eastern Antarctica from 1973 to 2000. *Marine Ecology Progress Series*, 366, 259–270.
18. Lake, S., Burton, H., Van den Hoff, J. 2003. Regional, temporal and fine-scale spatial variation in Weddell seal diet at four coastal locations in east Antarctica. *Marine Ecology Progress Series*, 254, 293–305.
19. Negri, A., Daneri, G. A., Ceia, F., Vieira, R., Cherel, Y., Coria, N. R., Corbalan, A., Xavier, J. C. 2016. The cephalopod prey of the Weddell seal, *Leptonychotes weddellii*, a biological sampler of the Antarctic marine ecosystem. *Polar Biology*, 39 (3), 561–564.
20. Pahl, B. C., Terhune, J. M., Burton, H. R. 1997. Repertoire and Geographic Variation in Underwater Vocalisations of Weddell Seals (*Leptonychotes weddellii*, Pinnipedia : Phocidae) at the Vestfold Hills, Antarctica. *Australian Journal of Zoology*, 45 (2), 171–187.
21. Peter J. H. Reijnders, H., Plotz, J., Zegers, J., Grafe, M. 1990. Breeding biology of weddell seals (*Leptonychotes weddellii*) at Drescher Inlet, riiser larsen ice shelf. *Antarctica Polar Biology*, 10 (4), 301–306.
22. Salganskiy, O.O., Dykyy, I.V. 2013. Growth characteristics of Weddell seal pups (*Leptonychotes weddellii*) of the Argentine islands. *Internationalization of Antarctic researchway to spiritual unity of humanity: abstracts VI International Antarctic Conference*. Kyiv, 15–17 May, 2013, 140–143.
23. Sato, K., Mitani, Y., Cameron, M. F., Siniff, D. B., Watanabe, Y., Naito, Y. 2002. Deep foraging dives in relation to the energy depletion of Weddell seal (*Leptonychotes weddellii*) mothers during lactation. *Polar Biology*, 25 (9), 696–702.

24. Schreer, J. F., Hastings, K. K., Testa, J. W. 1996. Prewearing mortality of Weddell seal pups. *Canadian Journal of Zoology*, 74 (9), 1775—1778
25. Stirling, I. 1972. Regulation of Numbers of an Apparently Isolated Population of Weddell Seals (*Leptonychotes weddellii*). *Journal of Mammalogy*, 53 (24), 107—115.
26. Stirling, I. 1969. Ecology of the Weddell seal in the McMurdo Sound, Antarctica. *Ecology*, 50, 573—586.
27. Terhune, J. M., Quin, Douglas, Dell’Apa, Andrea, Mirhaj, Mandana, Plotz, Joachim, Kindermann, Lars, Bornemann, Horst. 2008. Geographic variations in underwater male Weddell seal Trills suggest breeding area fidelity. *Polar Biology*, 31 (6), 671—680.
28. Testa, W. J. 1994. Over-winter movements and diving behavior of female Weddell seals (*Leptonychotes weddellii*) in the southwestern Ross Sea, Antarctica. *Canadian Journal of Zoology*, 72 (10), 1700—1710.
29. Testa, W. J., Scotton, Bradley D. 1999. Dynamics of an Isolated Population of Weddell Seals (*Leptonychotes weddellii*) at White Island, Antarctica. *Journal of Mammalogy*, 80 (16), 82—90.
30. Testa, J. W., Siniff, D. B. 1987. Population dynamics of Weddell seals (*Leptonychotes weddellii*) in McMurdo Sound, Antarctica. *Ecol. Monogr.*, 57 (2), 149—165.
31. Thomas, J. A., DeMaster, D. P. 1983. Diel haul out patterns of Weddell seal (*Leptonychotes weddellii*) females and their pups. *Canadian Journal of Zoology*, 61 (9), 2084—2086.
32. Thomas, J. A., DeMaster, D. P. 1983. Parameters affecting survival of Weddell seal pups (*Leptonychotes weddellii*) to weaning. *Canadian Journal of Zoology*, 61 (9), 2078—2083.
33. Van Polanen Petel, T. D., Giese, M. A., Wotherspoon, S., Hindell, M. A. 2007. The behavioural response of lactating Weddell seals (*Leptonychotes weddellii*) to over-snow vehicles: a case study. *Canadian Journal of Zoology*, 85 (4), 488—496.
34. Vaughan, R. W. 1968. The status of the Weddell seal (*Leptonychotes weddellii*) at South Georgia. *British Antarctic survey. Bulletin*, 15, 71—74.

П. Б. Хоцький *

Національний лісотехнічний університет України, м. Львів
Державна установа Національний антарктичний науковий центр МОН України, м. Київ

* Corresponding author: khojetsky@gmail.com

РОЗМНОЖЕННЯ ТЮЛЕНЯ УЕДДЕЛЛА *LEPTONYCHOTES WEDDELLII* (PHOSIDAE) В АКВАТОРІЇ АРХІПЕЛАГУ АРГЕНТИНСЬКІ ОСТРОВИ

РЕФЕРАТ. Мета. Дослідити розмноження *Leptonychotes weddellii* (Phocidae) в акваторії архіпелагу Аргентинські острови. **Методи.** Облік *L. weddellii* проводили на островах архіпелагу маршрутним методом з оглядом місць ймовірного знаходження тюленів. Переходи до островів, у залежності від льодової ситуації, погодних умов, здійснювали по морському льоду або з використанням човна. Ідентифікацію *L. weddellii* проводили згідно загальноприйнятої методики. **Результати.** У вересні—жовтні 2015 р. в акваторії архіпелагу Аргентинські острови встановлено п’ять осередків розмноження *L. weddellii*. У першому осередку (острови Троє Поросят) виявлено пологи у п’яти самок, у другому (околиці старої англійської станції) зареєстровано народження 4 тюленят, третьому (острови Форджі) — 4, четвертому (острови Блек Леопард) — 8, п’ятому (острови Гротто — Корнер — Уругвай) — 11 тюленят. Шостим осередком ймовірно були острови Бархани. Протягом періоду дослідження зареєстровано понад 76 % самок з приплодом і близько 24 % без тюленят. Спостереження свідчать, що самки заздалегідь припливають в акваторію архіпелагу для подальшого розмноження. Встановлено, що в шести самок пологи відбулися через добу після їх появи на березі острова або льодовому покриві, деякі самки народжували малят після чотирьох, шести і навіть семи діб. Протягом вересня—жовтня 2015 р. понад 50 % самок народжували на льодовому покриві, але на відстані, яка не перевищувала 10—15 м від узбережжя. Народження малят на істотній відстані від берега острова реєстрували рідко. **Висновки.** Весною 2015 р. вперше самку при пологах зареєстровано у першій декаді вересня, в останнє — у другій декаді жовтня, максимальну кількість пологів виявлено у третій декаді вересня. Період розмноження тривав 38 діб. Зареєстровано пологи у 32 самок, які народили 18 самців і 14 самок. Чисельність тюленят була більшою, ніж в попередні роки, відсутня післяпологова смертність і не зареєстрована смертність молодняка. Проведені дослідження дають змогу оцінити чисельність та структуру популяції виду в акваторії архіпелагу Аргентинські острови. Однак потребують подальшого вивчення деякі питання біології тюленя Уедделла у період розмноження, зокрема: просторово-часове поширення, еміграційні та імміграційні процеси в акваторії архіпелагу, які пов’язані з льодовою ситуацією, наявністю корму та розмноженням.

Ключові слова: *Leptonychotes weddellii*, розмноження, чисельність, Аргентинські острови, Антарктика.