Данні про географічне поширення вірусу гепатиту С, представлені в міжнародній базі даних нуклеїнових послідовностей генома вірусу Національної лабораторії Лос- Аламоса (Los Alamos National Laboratory), відображають нерівномірний розподіл генотипів вірусу по території земної кулі. Деякі генотипи зустрічаються по всьому світу, інші циркулюють в певних географічних зонах. Так, основні генотипи – 1, 2 і 3 (особливо їх субтипу: 1a – «Американський», 1b – «японський», 2a, 2b, 3a) найпоширеніші в світі, переважно в Америці, Західній Європі, на Далекому Сході, в Японії. Більш локальне поширення мають генотипи: 4 (домінує в Центральній і Північній Африці, Заїрі, на Середньому Сході), 5 (виключно в Південній Африці) і 6 (широко представлений в країнах Південно- Східної Азії) [7,8].

Правильне застосування сучасних молекулярних методів дозволяє оптимізувати наявні алгоритми противовірусного лікування і в деяких випадках одержати високі показники стійкої вірусологічної відповіді. Світовим стандартом лікування хворих хронічним гепатитом С є потрійна терапія інгібітором полімерази, пегільованим інтерфероном і рибавірином. Також зареєстровані 4 інгібітора протеази і 2 інгібітора полімерази, що дозволяє наблизити ефективність терапії до 100% і виключити зі схем лікування інтерферони [7].

Одержані дані свідчать про необхідність проведення систематичного молекулярно – епідеміологічного моніторингу для визначення закономірностей поширення генотипів вірусу гепатиту С в різних регіонах, що має важливе наукове і практичне значення.

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THEOLOGY

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SEX DIMORPHISM IN ADULT AZOV CASPIAN GULL *LARUS CACHINNANS CACHINNANS PALLAS, 1780*

Introduction

The taxonomic status of the gulls from *cachinnans* group is not clear and still discussed (Johnson 1985; Filchagov, 1992, Wink et al., 1994; Helbig, 1994; Heidrich et al., 1996; de Knijff et al., 2001). Many authors described field features of this forms (Klein, 1994; Gruber, 1995; Garner & Quinn, 1997; Garner et al., 1997; Jonsson, 1998). Still heated discussions under *cachinnans* could be caused among other things by poorly known populational variability within of the Caspian Gull. There are only two papers describing just some aspects of the morphometric problems (Mierauskas et al., 1991; Liebers & Dierschke, 1997). In this paper we show morphological variability within analyzed group and features to recognize sexes.

Material and methods

Gulls were trapped in the breeding colony at Molochnyy Lyman in 2000-2001, 2005-2011. This is salt reservoir near the north Azov seashore (20 km southeast from the Melitopol city). Natural formations around the Lyman are the salina and steppe. Total number of Caspian Gulls on the Lyman varies between 5,0 and 6,5 thousands of breeding pairs (Koshelev, 2000; Chernichko et al., 2000). All gulls were trapped on the nests on the Podkova Island, located near the Verchnya Girsovka village. About 2,000 pairs were breeding here at this time. The Podkova Is. is located about 100 m from the tip of narrow peninsula, and about 1 km from the eastern bank of Lyman. This is a lagoon-type islet, with diameter of about 700 m, and the lake of stagnant water in the central part. Most of area is open and flat only partially grown by reeds *Phragmites communis*. Birds nests are usually located on the ground, in low, dense vegetation (*Salicornia sp.)* or at the edge of reeds. Some nests were found in old Cormorant's nests (to 0,5 m above ground) or just on the open ground with no vegetation.

Some dead gulls found in the breeding colony and specimens collected in the INFS (Bologna, Italy) from Sivash Lake and Danube Delta were measured. The total of measured *cachinnans* is 80 birds.

Measurements description

For trapped birds was taken 28 parameters (14 metrical and 14 colour features), based on the instruction by P. Chylarecki, W. Meissner and A. Sikora with our corrections. Among standard measurements were: total head length (HE), bill length (BI), tarsus length (TR), wing length (WI). Additional were measured: bill height at gonydeal angle (HBIG), minimum bill height between gonydeal angle and skull (HBIN), middle toe length (MT), and «hand» – the distance between tip of 1st and 10th primary (DL) on maximum spread wing, not measured in moulting birds. Colours were determined for following parts of the gull body: iris (IR), scale 1 to 4, where (1) was pure pale with no dark pigmentation, (2) – a few and tiny dark spots, (3) – many, tiny or big dark spots (at the distance usually seems to be dark iris) and (4) – lots of dark pigmentation, covering all or almost all of the iris surface – at distance looked as totally dark eye. Eye-ring (ER) colour was determined in following scale: (1) – yellow or yellowish, (2) – pale orange, (3) – dark orange and (4) – reddish/red. Legs colour was determined separately for tarsus, toes and the swimming web with the same scale: (1) – «cadaverous» (pale grey, greyish, green-grey), (2) – pinkish to flesh pink, with no yellow tone admixed, (3) – pinkish with slight yellowish tinge, (4) – yellowish or pale yellow and (5) – deep yellow. It is need to notice, that all the colours were determined just after the bird was trapped (colours may bleed after few minutes because of bird's stress!). Mantle colour (M) was determined on alive, captured gulls or later, on the feathers taken from the mantle with the use of Kodak Gray Scale (Small) CAT 152 7654 1995 where 0 is white and 20 is black. The colour of tongue on P10 (Z) was determined in three categories: (1) white/whitish, (2) grey, but lighter than mantle and (3) grey, as dark as mantle.

To characterize black and white pattern on the outer primaries, following measurements were taken: maximal length of the white on P10 tip (W10); length of the white on P9, measured as the distance between the beginning of the white spot and the tip of the feather (W9); minimal length of the black bar on P10 (B10), length of the black on P9, measured from the distal end of grey/white tongue to the end of black bar (B9), in the same way length of black bar on P7-8 was measured (B7, B8). All the measurements were taken along the shaft. For two outermost primaries (P9-10) the types of black-white pattern were noted, in scales from 1 to 5. On P10 following types were recognized (T10): (1) – «*thayeri-pattern*» – grey or white tongue connected with the white primary tip, regardless of presence or absence of black bar (2) all white tip of the primary, no black markings, (3) – traces of black near the tip, (4) – incomplete subterminal black bar and (5) – complete subterminal black bar. For P9 the types were (T9): (1) – «*thayeri pattern*», grey/white tongue connected with the white tip, regardless of presence or absence of subterminal black bar, (2) – huge white spot, reaching both feather's edges, (3) – white spot do not reaching one of the feather edge, but reach the second one, (4) – small white spot on one web only, not reaching any edges of the feather and (5) – no white spot. Also the number of black-tipped primaries was noted (NB), and the type of black pattern on the innermost

primary with dark (TI) in three categories: (1) – only dark spots, (2) – incomplete black bar and (3) – complete black bar.

Blood samples were obtained from the most of the captured birds. Blood was conserved with EDTA buffor. Sex of gulls was determined with use of molecular methods (Polymerase Chain Reaction; Griffiths et al., 1998; Griffiths 2000; Kahn et al., 1998).

Results

Standard measurements. In wing length obvious sexual dimorphism is shown, with only a small overlap. The total head length is distinctly higher for males (mean 137.1 mm) than for females (mean 122.9 mm). Combination of wing length and total head length is very good character distinguishing sexes. Bill is longer and higher (at gonydeal angle) within males. Both sexes have the same bill proportions, so the bill ratio is the same. Longer bill with less prominent gonydeal angle in *cachinnans* results in general bill 'jizz' – it seem to be thinner and more elongated, what is useful in field identification. Note however, that some *cachinnans* males can look very heavy-billed, in both hand- and field-appearance and some females surprisingly delicate- and thin-billed. Both tarsus and middle toe are longer in males, although covering of dimensions between the sexes was found.

Iris & Eye-ring. Strong variability was noted in the eye-colouration within examined gulls. No birds with pure pale iris, without any dark spots were trapped. Out of 58 gulls, 26 have pale iris with a few dark spots admixed. Next 11 birds have a lot of dark pigmentation, covering most of iris, what from a distance looked as a completely dark eye. At the end of the scale (4) – completely dark iris – were 21 gulls. Background variability of iris is also observed, from very pale yellowish to khaki with greenish shade. Within birds no yellow eye-ring was found. Most of gulls (n=56) have eye-ring pale- (24) or dark-orange (30) and only two individuals have it reddish. Correlation between colours of iris and eye-ring was weak (Pearson $r = 0{,}31$).

Bill. Was usually pale yellow. It is worth to notice, that only females (5 of 32) have an amount of reddish tinge on upper mandible, in all males the reddish spot was restricted to the lower one. Out of 55 otherwise fully adults, 24 had various dark signs on the bill, which varied from single dark grey spot to black bill band. Recorded in the same proportion in both sexes, it was present also in 11- and 12-years old birds.

Legs. Legs colour varied strongly. Most of trapped gulls (n=56) had legs with «cadaverous» colour (such a colour could have been greyish, grey-green or pale pinkish «washed out» – 68% of trapped birds). The second big group are birds with some yellow on the legs (32%), the most numerous were pale yellow- or yellowish-legged birds. No birds with intensive, deep yellow legs were trapped. There are no difference in colour between tarsus, toes and swimming web in general. The only one bird (male)

with very intensively coloured tarsus and toes (pale yellow, 4 on the scale), had swimming web flesh yellow (5 on the scale, the same as in *michahellis*). Two next birds (female and male) had also more intensive colour on the swimming web (pinkish) than on the rest of leg (cadaverous).

To check how the colour depends on the light, we took a sample of birds seen from the distance. In the group of 104 adults, 58 had «cadaverous» legs and 46 had more or less yellowish tinge, sometimes very deep yellow. It is need to notice, that in strong sunlight «cadaverous», wet legs (with a slight yellowish tone) seen from a distance can look very yellow.

Mantle colour. The grey mantle colour varies strongly within *cachinnans* gulls. The lightest individuals were about 5.0 on the Kodak scale, while the darkest at about 7.0 (medium neutral grey), with the mean for all examined birds (n=56) placed at 6.22. There were no differences between males and females.

Wing-tip pattern. Black-and-white primary patterns are known to be diagnostic in identification of these gulls (Cramp & Simmons, 1983; Mierauskas et al., 1991; Garner & Quinn, 1997; Jonsson, 1998: and others).

Number of black-tipped primaries. *Varies from 5 to 7, and most frequent are birds with six or seven primaries with black. Commonest pattern is a complete or near-complete bar on P5, but on P4 were noted only single dark spots in 24% of individuals (outer web). Exceptionally one female had only 5 black-tipped primaries. Females evidently tend to have more white on the primaries, what results also in having more restricted black parts of the feathers in all examined features (P9 & P10 patterns, black and white dimensions, number of primaries with black). Differences between sexes are marked and statistically significant: 82% of females and 63% of males had 6 black-tipped primaries, against only 15% of females and 37% of males with 7 black-tipped primaries.*

Outermost primary (P10). On P10 connection of grey tongue and white primary tip and the extension of subterminal black bar developing were noted (see Material and methods). The one extreme is the lightest variant – a «*thayeri*»-pattern (very pale, usually white tongue connected with white primary tip, regardless of developing extension of subterminal black bar), the darkest one – fully developed subterminal bar, crossing the feather transversally (with the black bar separating pale tongue from the white primary tip).

Variability was found within population. Most numerous, together giving over 70% were types 2 and 3 (all-white P10 tip or white with traces of black). «*Thayeri*»-pattern was present with about 8% of birds, and all of them were females. P10 patterns of females differs from that of males, being moved to have more white in general (highly significant, χ^2 test, $p<0.001$). Black bar (B10), separating end of the inner web tongue from the white primary tip was narrow. Very pale, white or whitish inner web tongue strongly contrasts with black, and only in 4 of 55 individuals the border between

white and black was little diffused. All of them were males, with significantly more black on P10 (41.2 mm) than mean for males (31 mm). The white tongue is deepest from all European gulls, ending 58-115 mm from the primary tip, and often has specific shape. White primary tip (W10) is long, with mean of 65 mm.

Second outermost primary (P9). The P9 pattern was very stable (the reverse of P10 patterns). Huge white mirror, reaching both feather's edges was present in all males and in the most females. Only 5 females have it reduced to reach one of primary edges, but it still was present on both webs. One bird, a female, had «*thayeri*»-pattern. The black bar is strongly broader than on outermost primary. The white was shorter than on P10. Inner web tongue was still very pale, although can be darker grey than on P10; the typical shape and sharp delineation from black was present in almost all cases.

Discussion

Idetification of large gulls require a combination of multiple field marks (Klein & Gruber 1997; Jonsson, 1998 among others).

Variability within analyzed population seems to be more pointed for females. Also there are some features, mainly in basic measurements (Cramp & Simmons, 1983), let to distinguish sexes. Of course sexual dimorphism is evident from measurements, the males are larger then females (Harris & Hope Jones, 1969).

The difference between minimal and maximal (at gonydeal angle) bill height is obviously small within *cachinnans* gulls (0.4-2.1, mean 1.3 mm), smaller than in the two other european populations (*michahellis* and *argentatus*, t-test, $p=0.001$). Presence of dark sings on the bill were in the same proportioin as presented by Liebers & Dierschke (1997), c 50%. It seems to be specific for part of population. There is no evidence to judge age of the birds because of the presence a dark sings on the bill.

Iris in *cachinnans* group is variable but often more or less dark coloured (Garner & Quinn, 1997; Klein & Gruber, 1997), and it is a good feature distinguishing *cachinnans* from other european populations, among which dark-eyed gulls are extremely rare. No pale irises without any dark spots were noted in examined birds. Gulls observed from the distance seems to be «pale-eyed» but in hand iris in most cases has dark spots with different intensity. Liebers & Dierschke (1997) suggest that over 60% of birds have pale iris. It is very possible that to this group were joined birds with iris signed in our classification as a type 2 and probably sometimes type 3. Classification suggested by this authors basis on the impression which could depend on intensity of the light and can not be treated as given the factual view. Furthermore very weak correlation was found between colour of iris and eye-ring, in opposite to Liebers & Dierschke (1997).

We agree that from the distance legs in many birds are deep yellow (Liebers & Dierschke, 1997) especially under specific light condition (e.g. sun set). In-hand all birds never had deep yellow legs (such as *michahellis*), only admixed yellow or yellowish tones.

Females evidently tend to have more white on the primaries, what results also in having more restricted black parts of the feathers in all examined features (P9 & P10

patterns, black and white dimensions, number of primaries with black). According to Mierauskas et al. (1991) the number of the black-tipped primaries was 6 or 7, but in our analysis we found differences between sexes to be significant. While comparing our data referring types of black on P10 and P9 and data by Mierauskas et al. (1991) we find some new aspects. Interesting is that «thayeri» type appeared on the P10 (not recorded by Mierauskas et al., 1991) and/or on the P9 and only in females. Additionally on the P9 in males only type 2 were noticed. It seems to be very stable feature although there no statistically significant differences between sexes.

In summary, the morphometric variation of *cachinnans* could be very wide, but knowing the biometrical space it is possible to distinguish sexes on alive birds. Within defined variation exist typical and unique characters for *cachinnans*.

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ПАВУТИННИЙ ШОВК – УНІКАЛЬНИЙ БІОМАТЕРІАЛ

Актуальність дослідження біоматеріалів обумовлюється потребами сучасної медицини в надміцному, еластичному та досить легкому засобі, який мав би широкий спектр корисних властивостей і при цьому не відторгався організмом. Такий матеріал в природі існує мільйони років – це павутинний шовк. Проблема полягає в тому, що науковцям ще не доступне практичне використання цього матеріалу. Саме тому дослідження фізіологічних особливостей павуків, хімічного складу павутини, процесу її утворення є досить важливими для сучасної біологічної науки. Застосування цього матеріалу в хірургії, трансплантології, кардіології та інших галузях медицини було б значним кроком вперед.

Павуки – ряд членистоногих тварин, що належать до класу Павукоподібних, підтипу Хеліцерові – стали об'єктом дослідження широкого кола науковців, зокрема, В. Вагнера, Н. Полчанінової, С. Спаського, Д. Дубініна, Д. Харитонова та інших.

Медицина та павуки пов'язані досить давно. Ще за часів Плінія було відомо, що павуки сприяють при лікуванні від малярії, а в середні віки англійські лікарі за допомогою павутини зупиняли кровотечу. Геолог та натураліст XIX століття Г. Брістоу у своїх працях описав більше десяти рецептів по використанню павуків у медичних цілях. Практика по застосуванню цих тварин у науці не втратила актуальності на сьогоднішній день [1].

Учені Ганновера ведуть дослідження у галузі розробки нової методики пластичної хірургії, а саме, зшивання пошкоджених нервів. Науковці повідомляють,