

cal and chemical water conditions. Food protein content varied between 37.5 and 45%, while lipid content, added in the form of soybean oil, varied between 3 and 11%. The oil contained an adequate w - fatty acids concentration, necessary for fish growth. The main growth indicators determined at the end of experiment were total body gain (TBG), specific growth rate (SGR) and feed conversion ratio (FCR). There was a high statistical difference among the experimental groups receiving variable food combinations for each growth parameter ($P < 0,001$). Both, protein and lipid food content affected growth parameters, but in a different manner. Further analysis - percentage of change depending on lipid to protein ratio and bivariate surface analysis - allowed us to recognize the most economical combination: 39.5% protein + 9% lipid content. The addition of 9% soybean oil to the fish food reduces the necessary protein concentration by 5.5%, with resulting identical catfish growth effects.

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HISTOLOŠKE OSOBITOSTI GUŠTERAČE
NEKIH VRSTA DUPINA

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Gušterača istraživanih vrsta dupina svojom morfoloijom odgovara gušterači u sisavaca općenito. Dorzalnim dijelom povezana je naborom potrbušnice s uzlaznim kolonom i jetrom, a ventralnim dijelom leži u mezostukturi dvanaesnika. Histološki je to miješana egzokrini i endokrini žlijezda. Egzokrini dio je složena acinusna žlijezda, a otočići endokrino tkiva su manje nakupine stanica rasporedene između egzokrinih acinusa. Kako u nama dostupnoj literaturi nije opisana građa Langerhansovih otočića gušterače dupina i raspored pojedinih vrsta endokrinih stanica u njima, obavljeno je ovo istraživanje. Istraživanje je obavljeno na ukupno 7 životinja od čega su 4 dobri dupini (*Tursiops truncatus*) i 3 plavobijela dupina (*Stenella coeruleoalba*). Uzorci tkiva obrađeni su standardnim histološkim tehnikama, bojenje hemalaunom i eozinom za prikaz osnovne građe te Azan bojenje i Anilin blue-orange G bojenje (modificirano bojenje po Malloryju) za prikaz endokrinih stanica gušterače. Osnovna histološka građa gušterače istraživanih dupina odgovara onoj u kopnenih sisavaca. Otočići egzokrinih stanica su sitniji, ali zato brojniji nego je to slučaj u kopnenih sisavaca. Unutar ovih otočića, primjenom Azan metode bojenja, mogu se razlikovati tri vrste

stanica, dok se modificiranom Malloryjevom metodom jasno razlikuju dvije vrste endokrinih stanica. Pri tome su stanice s crveno-narančasto obojenom citoplazmom (po Malloryju) smještene periferno i odgovarale bi A-stanicama endokrinog dijela gušterače. Stanice s plavo obojenom citoplazmom (po Malloryju) smještene su centralno unutar Langerhansovog otočića i odgovarale bi B-stanicama endokrinog dijela gušterače. Azan metodom bojenja dobiven je isti raspored spomenutih stanica.

HISTOLOGICAL CHARACTERISTICS OF THE PANCREAS OF SOME DOLPHIN SPECIES

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Pancreas morphology of the investigated dolphins is generally similar to the pancreas of other mammalian specieses. Dorsal part of pancreas is connected to the ascending colon and liver with peritoneal fold. Ventral part lies in the mesoduodenum. Histologically, it is a mixed exocrine and endocrine gland. Exocrine part is complexed acinus gland, and islets of the endocrine tissue are disseminated between exocrine acinuses. Histological structure of the Langerhans islets and arrangement of different types of endocrine cells in dolphins pancreas wasn't described in accessible literature, so we made this investigation. Investigation was done at 7 animals: 4 bottlenosed dolphins (*Tursiops truncatus*) and 3 striped dolphins (*Stenella coeruleoalba*). Tissue samples were processed by standard histological techniques, staining with hematoxilin and eosin for general morphology, and Azan staining and Anilin blue-orange G staining (variety of the Mallory staining) for showing of the pancreas endocrine cells. General histological structure of pancreas in the investigated dolphins is similar to those in the terrestrial mammals but endocrine islets are smaller and mach numerous. With Azan staining can be different three type of cells inside of endocrine islets, and with modified Mallory staining can be different clearly two cells types. Cells with red-orange stained cytoplasm (Mallory) are peripherally placed and it can be A-cells of the endocrine part of pancreas. Cells with blue stained cytoplasm (Mallory) are placed centrally inside of Langerhans insula and that can be B-cells of the endocrine part of pancreas. The same cell ordering was produced with Azan staining.



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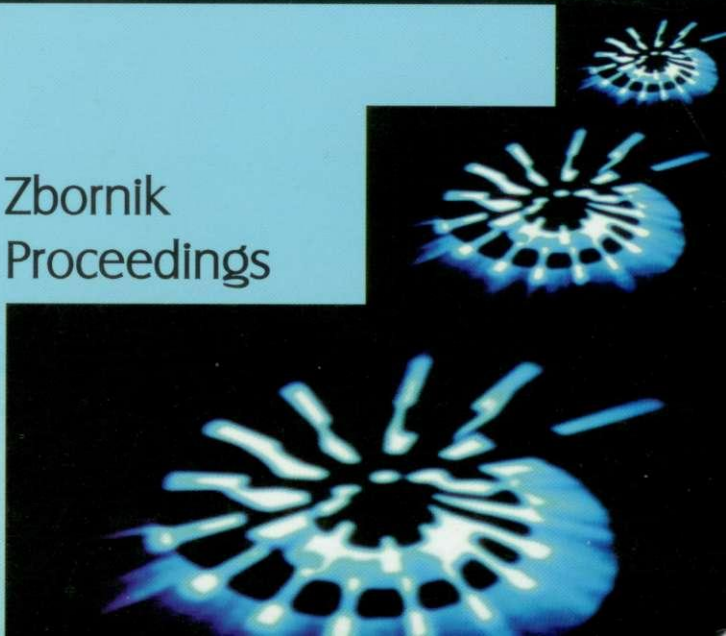
8. HRVATSKI BIOLOŠKI KONGRES

s međunarodnim sudjelovanjem
Zagreb, 27. rujna - 2. listopada 2003.

8th CROATIAN BIOLOGICAL CONGRESS

with International Participation
Zagreb, September 27 - October 2, 2003

Zbornik
Proceedings



Organizator kongresa i izdavač zbornika

Hrvatsko biološko društvo 1885

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UDK 57(063)

Hrvatski biološki kongres (8; 2003; Zagreb)
Zbornik sažetaka Osmog hrvatskog biološkog kongresa
= Proceedings of Abstracts of Eighth Croatian Biological
Congress / uredile = edited by Višnja Besendorfer,
Nevenka Kopjar. - Zagreb: Hrvatsko biološko društvo 1885.
- 538 str., 23,5 cm

Tekst na hrv. i engl. jeziku. - kongres je održan 27. rujna -
2. listopada 2003. u Zagrebu

Str. 7 - Kazalo

ISBN 953-6241-05-6

1. Besendorfer, Višnja
2. Kopjar, Nevenka