

FISH WELFARE FROM PERSPECTIVE OF CONSUMERS IN SERBIA (PRELIMINARY RESULTS)

RENATA RELIĆ¹, NADA LAKIĆ¹, VLADICA MLADENOVIĆ², ZORKA DULIĆ¹,
MAJA GRUBIŠIĆ¹, VESNA POLEKSIĆ¹

¹University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080 Belgrade, Serbia

²Veterinary station "Vethem", Miloša Velikog 132, 11320 Velika Plana, Serbia

DOBROBIT RIBA IZ UGLA POTROŠAČA U SRBIJI (PRELIMINARNI REZULTATI)

Apstrakt

Dobrobit farmskih životinja, među kojima su i ribe, u svetu je poseban značaj dobila u toku poslednje decenije, uz podršku odgovarajućih zakona i propisa kojima su definisani standardi u vezi uslova gajenja, transporta i klanja. Napori koji se ulažu u razvoj i unapređenje proizvodnje i poboljšanje kvaliteta ribljeg mesa u Srbiji takođe nameću potrebu da se obezbedi i visok nivo dobrobiti farmски gajenih riba. Ovo preliminarno istraživanje imalo je za cilj prikupljanje i analizu podataka o informisanosti i zainteresovanosti javnosti u Srbiji za zaštitu dobrobiti riba. U tu svrhu, upitnike je anonimno popunilo 235 punoletnih lica sa teritorije Republike Srbije. Dobijene informacije mogu da posluže i za određivanje optimalnog obima uzorka za buduća ispitivanja.

Statistička analiza strukture odgovora ispitanika u odnosu na njihove demografske, ekonomske i druge karakteristike izvršena je uz pomoć hi-kvadrat testa. Rezultati testiranja ukazuju da se odgovori značajno razlikuju u zavisnosti od nivoa obrazovanja, visine mesečnih primanja i mesta stanovanja ispitanika. Osim na pitanje „da li su upoznati da u svetu postoje propisi u vezi dobrobiti riba u toku uzgoja, transporta i klanja“ (pitanje 4), anketirani su na ostala pitanja u vezi dobrobiti (2,3,5 i 6) najčešće odgovorili potvrdno. Prema rezultatima, najčešće ispitanici sa višim i visokim obrazovanjem poznaju i razumeju termin "dobrobit životinja" (79,07%), kao i postojanje propisa u svetu o zaštiti dobrobiti životinja (49,61%). S druge strane, nezavisno od nivoa obrazovanja, najveći deo anketiranih češće bi kupovao ribu ili proizvode od ribe proizvedenu u uslovima u kojima se maksimalno poštuju životne potrebe riba i štiti njihova dobrobit (63,83%), a spreman je i da za to plati i više ukoliko je potrebno (57,87%).

O dobrobiti životinja bili su bolje informisani ispitanici sa mesečnim neto ličnim prihodom većim od 40000 dinara (tj. primanjima iznad republičkog proseka) u odnosu na one sa manjim prihodima (76,98% : 56,88%). Ispitanici sa većim primanjima pokazali

su i veću spremnost da češće kupuju ribu i proizvode od ribe uz saznanje da su proizvedeni u uslovima poštovanja dobrobiti (68,25% : 58,72%). Većina ispitanika iz gradskih i seoskih naselja (69,38% iz gradova sa više od 100.000 stanovnika – Beograd, Novi Sad, Niš i Kragujevac, i 66,67% iz manjih gradova; 59,26% iz seoskih naselja) smatra da je potrebno zaštititi dobrobit farmski gajenih riba, a spremni su i da plate više za bolji kvalitet, koji je omogućen gajenjem ribe uz poštovanje principa dobrobiti (57,50% iz velikih gradova; 68,75% iz manjih gradova i 40,74% iz seoskih naselja).

Uzimajući u obzir sve rezultate, može se reći da među potrošačima u Srbiji postoji zainteresovanost za zaštitu dobrobiti farmski gajenih riba, što ukazuje na značaj ove teme. Takođe, bolja informisanost javnosti može da doprinese intenzivnijim zahtevima za ribom boljeg kvaliteta i stvaranju realne potrebe za unapređenje uslova gajenja, čime se pruža mogućnost za dalja istraživanja u ovoj oblasti.

Gljučne reči: dobrobit, ribe, upitnik, potrošači, Srbija

Keywords: welfare, fish, questionnaire, consumers, Serbia

INTRODUCTION

Fish welfare is a topic developed particularly in the last decade in the world, simultaneously with intensification of fish production. The need to protect welfare of farmed fish resulted from the same reasons as for other farm animals. It is greatly influenced by experts' opinion and demands of consumers. Thus, in the European Union minimum standards for the protection of animals bred for farming purposes (including fish) have been laid down in an EU Council Directive from 1998. In 2005 the Council of Europe adopted a recommendation on the welfare of farmed fish and in 2008 the World Organization for Animal Health adopted guiding principles for fish welfare; also the industry has adopted various measures to safeguard fish welfare (EFSA, 2009; Solgaard and Yang, 2011).

In recent years, animal rights and welfare issues also become important in Serbia. The most discussed problems are related to human-cohabitating animals e.g. stray dogs (Vucinic et al., 2012) and to animals whose products are mostly used i.e. cows, pigs and poultry (Hristov et al., 2009; Relic et al., 2010) while fish welfare still does not represent such important topic as in other countries. However, Serbia's potentials in fishery and efforts directed to fish production improvement (Marković et al., 2011) indicate the need to ensure a high level of welfare of farmed fish. This is supported by the fact that diet, rearing conditions, transport, and slaughter procedures have a proven impact on raw meat's quality and possibility for its processing (Relić et al., 2010). Serbian legislative ("Animal welfare law", Anon., 2009) provides the possibility of protecting fish welfare. However, appropriate regulations are still required.

In this paper the results of preliminary research related to Serbian consumers' awareness and interest in welfare of farmed fish are presented.

MATERIALS AND METHODS

The research was conducted in the spring of 2013 by an anonymous survey of 235 adult persons from the territory of the Republic of Serbia. The questionnaire with four groups of questions was distributed to the respondents. The first group contained questi-

ons related to the structure of respondents: gender and age, level of education, amount of monthly net personal income, number of household members, presence of juveniles in the household and place of residence. In the second group were questions about frequency of fish consumption and habits of Serbian consumers. The third group was questions about terms related to rearing conditions and stress in fish, and the fourth group was questions about welfare issues.

In this paper, a part of results related to the answers which are significant to obtain information about consumer awareness and interest in the welfare of fish is presented. Beside the answers on the first set of questions, the responses to the questions from other groups were analyzed: question concerning the frequency of consumption of fresh fish and/or fish meat products consumption in the diet (Question 1), as well as answers of all questions from the fourth group, which considers knowledge of terms "animal welfare" (Question 2), the need to protect the welfare farmed fish (Question 3), the notion of the presence of regulations in the world on fish welfare during rearing, transport and slaughter (Question 4), the frequency of buying fish and/or fish meat products depending on the rearing conditions (Question 5) and readiness of the consumers to pay more for fish and/or fish products if they are produced under conditions of maximum respect of basic needs of fish and protection of their welfare (Question 6).

Data analysis was performed by using Stat Soft 6.1., and Microsoft Excel 2007 softwares. Distributions of responses are presented graphically through the structural circle or rectangle. For statistical analysis of the uniformity of answers through different categories and independence of the responses with respect to their demographic and other characteristics the chi-square test (χ^2) was used.

RESULTS AND DISCUSSION

Demographic structure (gender and age), economic (personal net monthly income) and other structures in the sample (educational structure, the structure of households by number of members and presence of juveniles, and categorization by the type of residence) correspond to the same structures in Serbia and the selected sample can be considered representative despite the random method of selection.

Number of males (110) did not significantly differ ($\chi^2 = 0.96$, $P = 0.328$) from the number of female respondents (125). Respondents were not equally distributed by age contingents ($\chi^2 = 25.66$, $P < 0.001$), and the majority were in the group of 40 to 49 years (71). Persons under the age of 40 (101) were more prevalent than people older than 49 years (63). Number of respondents with lower (106) and higher education (129) was not significantly different ($\chi^2 = 2.25$, $P = 0.134$). According to the monthly net personal income respondents were equally distributed in the group with incomes lower and higher than the national average ($\chi^2 = 1.23$, $P = 0.267$) of about 40,000 dinars (Anon, 2013). Predominant respondents were from households with three (67) and four (65) household members, and the presence of respondents from households with different number of members was statistically very significant ($\chi^2 = 36.13$, $P < 0.001$). Persons under the survey were in significantly larger number (153) in households with no person under the age of eighteen years ($\chi^2 = 21.45$, $P < 0.001$), as well as in four cities with over 100,000 residents i.e. Belgrade, Novi Sad, Niš and Kragujevac (160) ($\chi^2 = 130.53$, $P < 0.001$).

Based on the responses to the Question 1, consumers in Serbia eat fish and/or fish products several times a month (Fig. 1).



Figure 1. Layout of the respondents according to the frequency of fish and/or fish meat products consumption

Except to the Question 4 (about awareness regarding the existence of the fish welfare regulations in the world) to the rest of the questions (2, 3, 5 and 6) the respondents answered mainly affirmatively (Fig. 2).

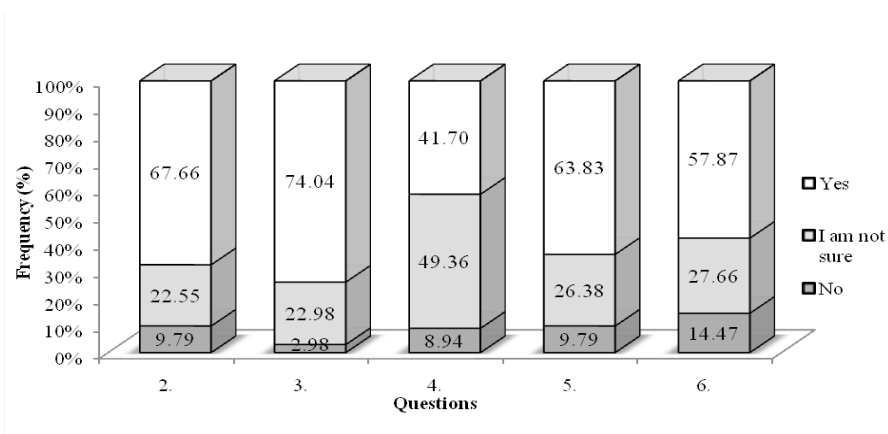


Figure 2. Frequency of answers to the questions related to welfare

According to the results in Table 1 frequency of fish and/or fish products consumption (Question 1) did not depend on gender and age, number of household members and the presence of juveniles in the household. Awareness of the respondents about meaning of the term "animal welfare" (Question 2) depended on their education and personal income. Residents of different types of settlements (big city, city, and village) have had a different opinion about the need to protect the welfare of farmed fish Question 3). The structure of the answers regarding information about fish welfare regulations in the world (Question 4) is not the same for respondents with different levels of education.

Readiness of the respondents to buy more fish and/or fish products (Question 5) depends on the level of their education, the level of personal net monthly income, and the place of residence, while willingness to pay more for these (question 6) depends only on the level of their education and the place of residence. The frequency of fish and/

or fish products consumption (Question 1) has been associated with: knowledge of the term "animal welfare" (Question 2), the decision of consumers to buy more fish and fish products if they are produced with maximum respect to welfare principles (Question 5), and their readiness to pay more for such products (Question 6).

Table 1. Significance levels (P – values)* of tested independence of respondents layout on the modalities of their characteristics, and their responses to the question

| Characteristics | Number of the question | | | | | |
|-------------------------------|------------------------|------------------|------------------|--------------|------------------|--------------|
| | 1. | 2. | 3. | 4. | 5. | 6. |
| Gender | 0.104 | 0.187 | 0.807 | 0.358 | 0.231 | 0.106 |
| Age | 0.329 | 0.504 | 0.210 | 0.431 | 0.827 | 0.750 |
| Level of education | 0.243 | <0.001 | 0.070 | 0.008 | <0.001 | 0.004 |
| Monthly income | 0.008 | 0.004 | 0.367 | 0.316 | 0.019 | 0.064 |
| Number of household members | 0.900 | 0.687 | 0.823 | 0.072 | 0.699 | 0.891 |
| Juveniles in the household | 0.140 | 0.158 | 0.509 | 0.668 | 0.581 | 0.404 |
| Place of residence | 0.110 | 0.814 | <0.001 | 0.726 | <0.001 | 0.004 |
| Frequency of fish consumption | - | 0.008 | 0.366 | 0.162 | 0.030 | 0.011 |

* Bolded values are significant

Further analysis showed that most of the people with higher (79.07%) and lower (53.77%) **level of education** know the term "animal welfare" and its meaning, and the lowest proportion (2.13% with higher and 16.98% with lower level of education) had never heard of it. Structure of the responses was favorable in both categories of respondents. The similar proportion of the respondents with lower (49.06%) and higher education (49.61%) presumed the presence of fish welfare regulations in the world. However, more consumers from the group of less-educated did not know about foreign welfare regulations (15.09% : 3.88%), and the bigger part of educated was familiar with it (46.51% : 35.85%). Regardless of the level of education, majority of the respondents (56.60% and 64.34%) more likely would buy fish produced in the compliance with welfare requirements; for the smaller number (17.92% and 3.10%) production conditions are not significant, and the rest of respondents were undecided (25.47% and 27.13%). Among respondents with lower and higher education, the smallest proportion would not pay more for fish grown in welfare protected conditions (22.64% and 7.75%, respectively). Similar results were obtained by Solgaard and Yang (2011) where higher educated persons appeared to be more willing to pay extra for welfare.

The structure of respondents according to their knowledge about animal welfare in groups with **different monthly net personal income** very significantly differed (Table 1). The term and meaning of "animal welfare" have been known to the majority of the respondents with lower (56.88%) and higher income (76.98%). In the subgroup with monthly income up to 40,000 RSD 12.84% and in the second subgroup (over 40,000 RSD) 7.14% of respondents never heard of "animal welfare". Furthermore, income level significantly affected the decision to purchase more fish and/or fish products (Table 1). For most of the consumers in both groups (58.72% and 68.25%), information about better fish rearing conditions was important, and it was not significant in 15.60% (lower income) and 4.76% (higher income).

The structure of the answers on the third, fifth and sixth question differed in the respondents from **different types of settlements** (Table 1). In the cities 75.00% or more and in the villages 51.85% of the respondents protection of the welfare of farmed fish consider as necessary. The opposite opinion expressed 1.88% of respondents from the largest cities, 0.00% from other cities and 14.81% from rural areas. More fish and/or fish products would like to buy 62.50% of the respondents from the four largest cities, 81.25% from other cities and 40.74% from villages, if they for certainly know it was produced with maximum fish welfare protection. Furthermore, in the cities 31.25% and 18.70%, and in the villages (22.22%) of the consumers were undecided. Respondents which would not change the frequency of purchasing after being informed that the production takes into account fish welfare were from rural areas (37.04%). In the large cities 57.50% of responders, and 68.75% from other cities and 40.74% in villages was ready to pay more for fish welfare. In negative answers the opposite tendency was registered: 11.25% of respondents from large cities, 12.50% from other cities and even 37.04% from the villages are not ready to pay more.

Significant relation between the **frequency of fish consumption** and knowledge of the term welfare is interesting: consumers who eat fish and/or fish products several times a week or every day (Question 1) in 91.11% i.e. 100% knew the term "animal welfare" and its meaning (Question 2). Minimum involvement of welfare acquainted (57.89%) was among consumers which use fish and/or fish products several times a year. Among respondents who consume fish few times a month (what is the most often according to figure 1) 62.59% knew the term "animal welfare" and what it means, and 66.67% of non consumers knew about welfare. The proportion of respondents who have never heard the term "animal welfare" is moving in the opposite direction of the frequency of fish consumption. All of the respondents who eat fish every day were more likely to buy and willing to pay more for fish cultured with respect of the welfare principles. Approximately the same percentage of consumers of fish a few times a year was not ready (34.21%) and χ^2 ready (36.84%) to pay for more expensive fish or products.

χ^2 -test also showed that there is a dependency in the distribution of respondents by answer to two questions from the group about welfare (Table 2). Only consumers' decision about frequent purchasing of fish or its products (Question 5) does not depend on their information about welfare regulations in the world.

Table 2. Significance level (P – values)* of the independence of respondents distribution by their answers to the two questions about welfare

| Number of the question | 3. | 4. | 5. | 6. |
|------------------------|--------|--------|--------|--------|
| 2. | <0.001 | <0.001 | <0.001 | <0.001 |
| 3. | | <0.001 | <0.001 | <0.001 |
| 4. | | | 0.166 | 0.003 |
| 5. | | | | <0.001 |

* Bolded values are significant

Data obtained in this survey are comparable to the results from the paper by Honkanen and Olsen (2009), and Solgaard and Yang (2011). Their surveys were conducted in countries where the welfare of farmed fish is more important issue then currently in

Serbia, and their experiences can significantly contribute to the adoption of appropriate standards of fish breeding in our country. The importance of surveys in endorsement of welfare regulations confirmed the paper by Stafford and Mellor (2009).

CONCLUSIONS

Based on the results, city residents are more interested in fish welfare protection than those living in villages. They showed more willingness to frequently purchase fish produced according to the welfare standards and to pay more for that. Besides, more educated consumers and those with higher personal income are better informed about animal welfare and more likely to buy fish and fish products if they were confident that during the production attention was paid to fish welfare. More educated consumers are also better informed about presence of regulations regarding fish welfare in the world, and they are willing to pay more for better quality of fish.

Considering all results of this preliminary study, there is an interest among consumers in Serbia to protect the welfare of farmed fish, which indicates the importance of this issue. By Better informing of consumers about fish welfare can contribute to a real need for improvement of fish rearing conditions through appropriate regulations. This provides an opportunity for further research in this area.

ACKNOWLEDGMENT

The study is supported Ministry of Education, Science and Technological Development, Republic of Serbia, project No. TR-31075.

REFERENCES

- Anon (2009): Zakon o dobrobiti životinja. Sl. glasnik RS, br. 41/2009.
- Anon (2013): Podatak o visini prosečne zarade po zaposlenom isplaćene u prvom kvartalu 2013. godine. Službeni glasnik RS, br. 38/2013.
- Honkanen P., Olsen S.O. (2009): Environmental and animal welfare issues in food choice: The case of farmed fish. *British Food Journal*, Vol. 111 Iss: 3, 293 – 309.
- Hristov, S., Stanković, B., Petrujkić, T. (2009). Welfare and biosecurity standards on cattle and pig farms - cattle and pig rearing conditions. *Vet. glasnik* 63 (5-6) 369 – 379.
- Marković, Z., Stanković, M., Dulić, Z., Živić, I., Rašković, B., Spasić, M., Poleksić, V. (2011): Aquaculture and fishery in Serbia-status and potentials. *Proceedings of V International Conference "Aquaculture & Fishery"*, Faculty of Agriculture, Belgrade-Zemun, Serbia, June, 1 – 3, 2011, 36 – 40.
- Relić, R., Hristov, S., Bojkovski, J. (2010): Application of Methods to Assess the Welfare of Dairy Cows on Farms in Serbia. 9th International Symposium „Prospects for the 3rd Millennium Agriculture“, 30th September-2nd October 2010, UASVM Cluj-Napoca, Romania. *Bulletin UASVM, Veterinary Medicine* 67(1)/2010, 256-262.
- Relić, R., Vučinić, M., Radenković-Damnjanović, B. (2010): Dobrobit riba sa aspekta bezbednosti hrane (Welfare of fish with aspects of food safety). *Zbornik radova XXI Savetovanja DDD u zaštiti zdravlja životinja i ljudi sa međunarodnim učešćem*, 27. do 30. maj 2010, Vrnjačka Banja, 155-161.
- Solgaard, H.S., Yang, Y. (2011): Consumers' perception of farmed fish and willingness to pay for fish welfare. *British Food Journal*, Vol. 113 Iss: 8, 997 – 1010.

Stafford, K.J., Mellor, D.J. (2009): The implementation of animal welfare standards by Member Countries of the World Organisation for Animal Health (OIE): analysis of an OIE questionnaire. *Rev. sci. tech. OIE*, 28 (3), 1143-1164.

Vučinić, M., Pelemis, M., Todorović, Z., Prostran, M. (2012): Free-roaming dogs welfare issues in Belgrade, Serbia. 1st International Conference on Dog Population Management. York, 4-8 September 2012. Book of abstracts, 35-36.