A STUDY ON CONSUMER ATTITUDES TOWARDS PRODUCTS DERIVED FROM NON-NATIVE FARMED STURGEON SPECIES (*ACIPENSER BAERII*, BRANDT, 1869)

C. T. Cîrmaciu (Florea), P. Macovei*, C.-E. Nistor, G.-V. Hoha, B. Păsărin

Faculty of Food and Animal Sciences, Iasi University of Life Sciences, Iaşi, Romania

Abstract

The Siberian sturgeon (Acipenser baerii, Brandt, 1869) is a non-native species farmed in Romania for meat and caviar, but consumer attitudes towards it remain little explored. This exploratory study assessed knowledge, purchase intention, acceptable price and attitudes regarding quality, sustainability and Romanian origin among 75 students in the fields of food control, public catering and animal science. An online questionnaire with 27 questions was administered in September–October 2026 and analysed with Fisher's exact, χ^2 and Spearman tests. Only 9 respondents mentioned the Siberian sturgeon, yet 66.7% would probably or very probably buy farmed meat, most of them at 50–99 RON/kg (63.5%). Intention was higher among those who rated nutritional value as high (80.0% vs. 51.4%) and among those more familiar with sustainable aquaculture (82.4% vs. 53.7%), but not among previous consumers. Informing consumers about nutrition and sustainable production could support acceptance.

Key words: *Acipenser baerii, aquaculture, feeding behaviour, sensory quality, sustainability*

INTRODUCTION

Sturgeons (*Acipenseridae*) are considered the most threatened group of vertebrates in the world, with approximately 85% of species classified in IUCN threat categories [1]. The Danube is the only river in the European Union with naturally reproducing sturgeon populations [2]. In 2021, Romania extended indefinitely the temporary (five-year) ban on fishing for and selling the six species of wild sturgeon and their derived products [2]. Nevertheless, according to a market survey conducted in Bulgaria, Romania, Serbia and Ukraine, almost one third of the sturgeon product samples purchased were found to be sold illegally [3].

World caviar production in 2017 was about 364 t, and sturgeon biomass obtained in aquaculture about 102,000 t [4].

The Siberian sturgeon (*Acipenser baerii*, Brandt, 1869) is the dominant species in world sturgeon aquaculture and accounts for approximately 31% of the volume of world caviar production [1]. The species is non-native in Romania, where it is farmed exclusively under controlled aquaculture conditions, unlike the four native species of the Danube basin (*Huso huso, A. gueldenstaedtii, A. stellatus and A. ruthenus*) [1], so the derived products come from aquaculture based on an introduced species, not from a traditional fishery. Although the meat is often regarded as a by-product of the caviar industry, it is essential to farm profitability, and in the European Union most farmed sturgeon meat is frozen and exported to Eastern European markets and Russia [1].

Consumer acceptance is a decisive factor for the development of aquaculture

*Corresponding author: petronela.macovei@iuls.ro

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products. Fish purchase decisions depend on attitudes, subjective norms and perceived control, according to the theory of planned behaviour [5], while consumer acceptance of and trust in farmed seafood remain low in many markets [6]. A study of consumers in eight European countries showed that the accepted price premium for sustainable seafood ranged from 7% to almost 20%, depending on the attribute and the country, and that the largest group of consumers was not willing to pay anything extra [7]. In Romania, the only preliminary study we identified involved 50 people and general fish preferences [8], and we identified no studies on Romanian consumers' attitudes towards farmed Siberian sturgeon meat and caviar.

The aim of this exploratory study was to assess knowledge, consumption experience, purchase intention and acceptable price for farmed *A. baerii* meat, as well as attitudes towards quality, sustainability, Romanian origin and the role of aquaculture in conservation, among young people trained in aquaculture, food control and public catering. The results show a high purchase intention despite low knowledge of the species, associated more with the perception of nutritional value and familiarity with sustainable aquaculture than with previous consumption experience.

MATERIAL AND METHOD

The study was carried out using the survey method, with a structured questionnaire of 27 questions, in Romanian, administered online via Google Forms between September and October 2026. The questionnaire was addressed to students in the control and expertise of food products (CEPA), Engineering and management in public food service and agritourism (IMAPA), and animal science. Participation was voluntary, and respondents were informed about the purpose of the study and gave their consent by completing the questionnaire. The study was anonymous, voluntary and did not involve sensitive personal data. The questionnaire comprised four parts: (I) sociodemographic data (specialization, year of study, age group, gender, residence environment); (II) fish consumption and purchasing habits (frequency, type, place of purchase, selection criteria); (III) knowledge and consumption of sturgeon (known species, meat and caviar consumption, sensory and nutritional perception); (IV) purchase intention, importance of Romanian origin, perception of sustainable aquaculture and its economic potential, and the maximum accepted price for 1 kg of farmed *A. baerii* meat. Most questions were closed-ended (single or multiple choice and 1–5 Likert-type scales). The sample was a convenience sample of 75 respondents. Respondents were recruited by sharing the link to the online questionnaire, and participation was open. Associations between variables were tested with the χ^2 test or Fisher's exact test, and the relationship between familiarity and intention was assessed with Spearman correlation. Purchase intention was used as the outcome variable, following approaches in consumer behaviour research [7].

RESULTS

Sociodemographic data. The sample comprised 75 students, mostly in their fourth year (60.0%) and in the 18–25 age group (94.6%). The CEPA specialization (50.7%) and female gender (74.3%) predominated, and the residence environment was balanced (52.7% rural, 47.3% urban).

Fish consumption and purchasing criteria. Fish was consumed monthly by 56.0% of respondents, annually by 25.3% and weekly by 18.7%. Most preferred both freshwater and marine fish (67.6%), the main place of purchase being the supermarket or hypermarket (58.1%), followed by fishmongers (29.7%), markets (8.1%) and fish farms (4.1%). Freshness was the main selection criterion (58.1%),

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far ahead of price, appearance and recommendations (9.5% each). Product quality was considered very important by 62.2% of respondents and important by 29.7%.

Knowledge and consumption of sturgeon. Sensory and nutritional perception. The beluga (*Huso huso*) was the most frequently mentioned species (25 mentions), whereas the Siberian sturgeon (*A.baerii*) was mentioned by only 9 respondents, as were the stellate sturgeon and the Russian sturgeon *(Acipenser gueldenstaedtii)*; 13 respondents did not know any sturgeon species (Fig. 1).

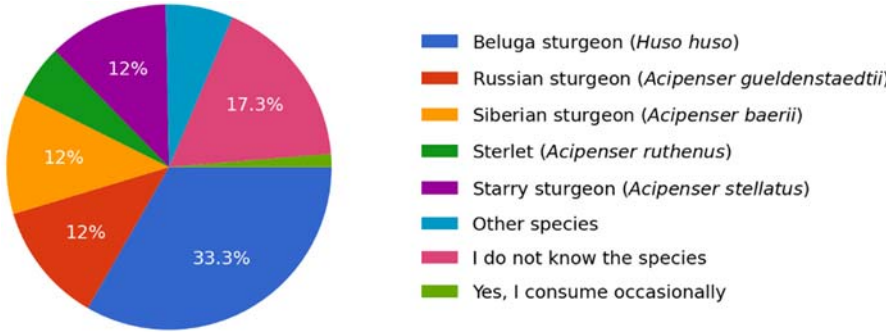


Fig. 1 Knowledge of sturgeon species

Sturgeon meat had been consumed by 46.7% of respondents, 33.3% had not consumed it, and 20.0% were not sure (Fig. 2a), while caviar had been consumed by 16.2% (Fig. 2b).

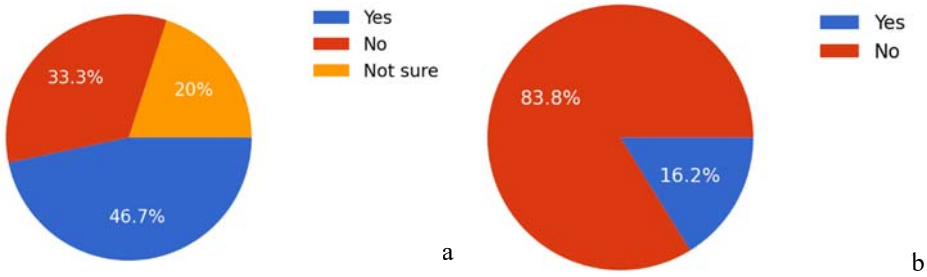


Fig. 2 Consumption of sturgeon meat (a) and caviar (b)

Among the respondents who described the texture of sturgeon meat (n = 46), most used the term “tender” (about 20 responses), followed by “firm” or “dense” (about 10). Taste was rated as better than that of other species by 27.0% of respondents, while 47.3% could not say. Freshness was the most important characteristic for meat quality (mean 4.39), followed by taste, texture, smell and colour (Table 1). Among the nutritional characteristics that would lead them to choose sturgeon meat, the most frequent were high protein content (53.3%) and omega-3 fatty acids (42.7%), while 37.3% stated that they did not know enough about its nutritional value.

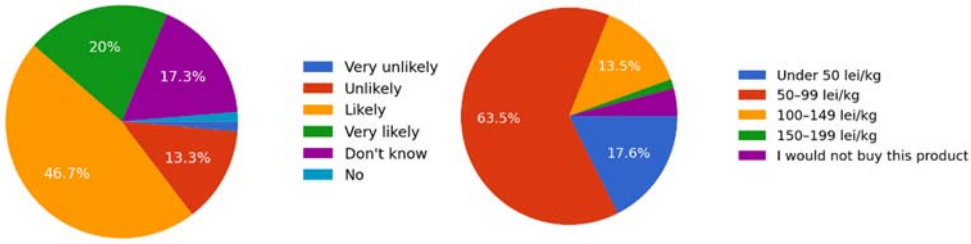
Nevertheless, 53.3% considered sturgeon a meat source of high nutritional value to a large or very large extent. Favourable purchase intention was more frequent among respondents who rated nutritional value as high (80.0%) than among the others (51.4%).

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Table 1. Importance of sturgeon meat characteristics (1–5 scale)

Characteristic	n	Mean ± SD	Rated 5 (%)
Freshness	66	4.39 ± 0.94	68.2
Taste	65	4.28 ± 0.94	60.0
Texture	65	4.23 ± 0.96	56.9
Smell	65	4.12 ± 1.07	55.4
Colour	64	4.00 ± 1.08	46.9

Purchase intention, origin, sustainability and price. For farmed *A.baerii* meat, two thirds of respondents (66.7%) stated that they would probably or very probably buy it, 17.3% were undecided and 2.7% gave clearly negative answers (Fig. 3a). The maximum price accepted for 1 kg of *A. baerii* meat was 50–99 RON/kg for 63.5% of respondents, under 50 RON/kg for 17.6% and at least 100 RON/kg for 14.9%, while 4.1% would not buy the product (Fig. 3b).



a b

Fig. 3 Purchase intention (a) and maximum accepted price per kilogram for farmed *Acipenser baerii* meat (b)

For an *A. baerii* producer, caviar was considered the most economically valuable product by 52.0% of respondents, and meat by only 9.3% (Fig. 4).

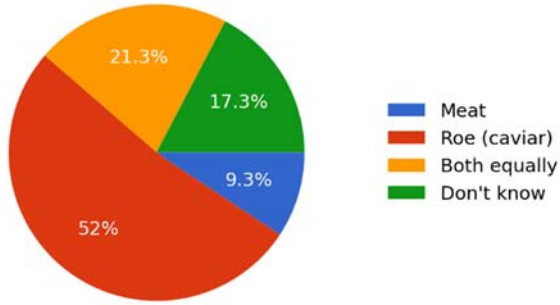
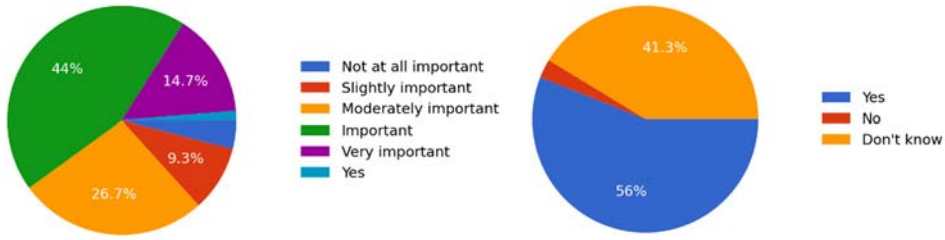


Fig. 4 Most economically valuable product for a producer

Romanian origin was considered important or very important by 59.5% of respondents (Fig. 5a). Familiarity with the concept of sustainable sturgeon aquaculture was low (54.7%) (Fig. 5c). Nevertheless, 82.7% would pay more for certified or sustainable products (Fig. 5d), 77.3% consider that aquaculture contributes to the conservation of the species (Fig. 5e), and 56.0% attribute economic potential to it in Romania (Fig. 5b).

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a b

Fig. 5a Respondents' willingness to pay more for certified or sustainable fish products
Fig. 5b Respondents' perception of the contribution of aquaculture to the conservation of sturgeon species

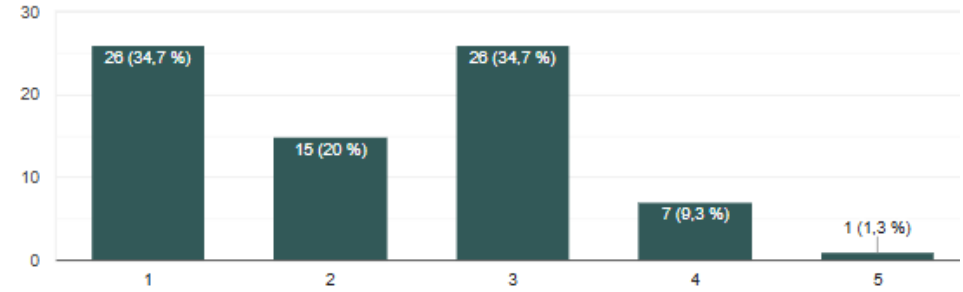
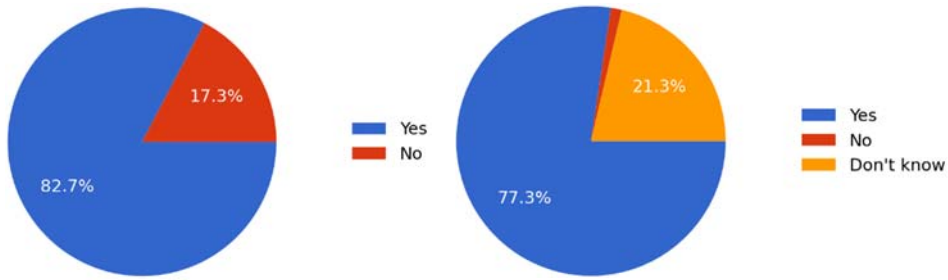


Fig. 5c Respondents' familiarity with the concept of sustainable sturgeon aquaculture, on a scale from 1 (not at all familiar) to 5 (very familiar)



d e

Fig. 5d Importance attached to fish originating from farms in Romania
Fig. 5e Respondents' perception of the economic potential of sturgeon aquaculture in Romania

Associations between variables are exploratory and were not corrected for multiple comparisons. Respondents with greater familiarity with sustainable aquaculture more often had a favourable intention to buy *A. baerii* meat (82.4%) than those with low familiarity (53.7%), and those who associated aquaculture with conservation more often had a favourable intention (72.4% vs. 47.1%). Intention did not differ significantly according to previous consumption of sturgeon meat, recognition of economic potential, attitude towards paying a higher price for sustainable products, or specialization. Acceptance of a price of at least 100 RON/kg was also not associated with these variables. The importance of Romanian origin showed a stronger tendency in rural (69.2%) than in urban (48.6%) areas.

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Favourable intention was more frequent among women (74.5%) than among men (47.4%).

DISCUSSIONS

The results highlight a central contrast: the Siberian sturgeon is little known (9 mentions, versus 25 for beluga), yet the intention to buy farmed *A. baerii* meat is high (66.7%). The renown of the beluga probably reflects the collective memory of a protected species whose fishing and sale in the wild state are banned in Romania [2], whereas *A. baerii* reaches the market through aquaculture [1,4]. The fact that the meat is often seen as a by-product of caviar [1] may contribute to the low awareness of the product. Intention appears to precede knowledge and experience: only 46.7% had consumed sturgeon meat, and intention did not differ significantly by previous consumption (71.4% vs. 62.5%). In a framework such as the theory of planned behaviour [5], the result suggests that attitudes and perceptions may matter more than direct experience.

In terms of quality, freshness dominated the selection criteria, and texture was described predominantly as tender or firm, in agreement with the description of *A. baerii* meat as firm and free of intramuscular bones [1]. Almost half of respondents (47.3%) could not compare the taste with other species, which limits the sensory interpretation. The nutritional characteristics mentioned most often (protein, 53.3%; omega-3, 42.7%) correspond to the profile of *A. baerii* meat, which is rich in high-biological-value protein and omega-3 fatty acids [1]. However, 37.3% stated that they did not know enough about its nutritional value. Respondents who rated nutritional value as high more often reported an intention to buy (80.0% vs. 51.4%), which indicates, in the exploratory analysis, that nutritional information could support acceptance of *A. baerii* meat.

The accepted price for *A. baerii* meat is concentrated in the 50–99 RON/kg range (63.5%), and only 14.9% accept at least 100 RON/kg, which suggests positioning as an affordable rather than an exclusive product; the values should be compared with actual shelf prices. The result is consistent with the estimate that, in the short term, demand remains below supply on the world market for sturgeon meat and caviar [4]. Caviar was perceived as the most valuable product for a producer (52.0%), in agreement with the approximately 31% share of *A. baerii* in world caviar production [1], although only 16.2% of respondents had consumed caviar. Meat, which is more accessible to consumers, can complement this value in farm strategies.

Regarding sustainability and biodiversity, the favourable attitudes (82.7% would pay more for sustainable products; 77.3% associate aquaculture with conservation) contrast with the low familiarity with the concept (median = 2) and with the low acceptance of and trust in farmed products reported in the literature [6]. In a European study, the largest consumer segment was not willing to pay extra for sustainability, and the premium in the other segments ranged from 7% to almost 20% [7]. The declared enthusiasm in our sample may reflect social desirability and does not guarantee actual purchasing behaviour. The association between familiarity and purchase intention (p = 0.013), although exploratory, suggests that educating consumers about sustainable sturgeon aquaculture may be a promotional tool. Perceptions regarding conservation are perceptions, not measured effects on biodiversity. The importance of Romanian origin was greater in rural (69.2%) than in urban (48.6%) areas, a difference at the level of a tendency.

The only significant difference between groups was by gender: favourable intention was more frequent among women (74.5%) than among men (47.4%; p = 0.046). The

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result is exploratory and should be interpreted with caution, as men were few (n = 19). The literature is mixed: in a study of 387 consumers, women gave higher acceptability scores to several aquaculture species [9], whereas a systematic review found no clear association between sex and fish and seafood consumption [10].

Limitations. The sample is small (n = 75), a convenience sample consisting of students in food and animal science fields, mostly young (94.6% aged 18 to 25) and women (74.3%). The data reflect stated intentions, not observed behaviour. Only four questions explicitly concerned the species *A. baerii*; the others (consumption, taste, texture, nutritional value) concerned sturgeon in general, so the conclusions on quality apply to the species only insofar as respondents associate it with the sturgeon they consumed. The "*don't know*" answer was classified as unfavourable intention, and the exploratory analyses were not corrected for multiple comparisons. Future research should use nationally representative samples, real tastings, species-specific questions and willingness-to-pay estimation methods based on choice experiments.

CONCLUSIONS

The Siberian sturgeon is poorly known among young people in the food and animal science fields, compared with the traditional Danube species, although the intention to buy farmed *A. baerii* meat is high. Receptiveness precedes knowledge and consumption experience.

The accepted price for *A. baerii* meat is concentrated in a moderate range, and the segment willing to pay high prices is small, which indicates positioning of the meat as an affordable rather than an exclusive product, subject to comparison with actual market prices.

For *A. baerii* producers, caviar is perceived as the product with the greatest economic value, although its consumption is low. Meat, which is more accessible to consumers, can complement this value in farm strategies.

Freshness and sensory quality dominate the selection criteria. In the exploratory analyses, the perception of the nutritional value of sturgeon and familiarity with sustainable aquaculture were associated with the intention to buy *A. baerii* meat, unlike previous consumption. Informing consumers could support acceptance of the product more than mere exposure to it.

Favourable attitudes towards sustainability, conservation and Romanian origin are widespread, although knowledge of the concepts is low. The results describe perceptions, not measured effects on biodiversity, but they support the use of these arguments in communication about *A. baerii* farmed in Romania.

Further research based on a larger questionnaire with a greater number of respondents, including more diverse consumer groups, is recommended to confirm and extend these exploratory findings.

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