

LETTER

Challenges and recommendations for improving the caviar labeling system

Sturgeon are the most endangered species on the International Union for Conservation of Nature (IUCN) Red List. Even today, poaching and the illegal trade still pose major threats. In response to these threats, a universal labeling system for the international caviar trade was introduced in 2000. This letter discusses the current state of the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) labeling system and suggests improvements to overcome existing shortcomings.

Since 1998, all species of sturgeon and paddlefish have been listed in the Appendices of the CITES, in an attempt to address the severe population declines. To improve traceability in the global legal caviar trade and enable the identification of its source and origin, a standardized labeling system for international trade was established in 2000 (CITES Resolution Conf. 12.7 2020). The label must contain the following information in particular: species/source (wild or captive)/country of origin/year of harvest/identification number for the processing plant/lot identification number. Since the establishment in 2000, the system has been revised to increase its effectiveness. Regulations regarding the labeling of caviar containers have been expanded to oblige all entities engaged in international and domestic trade to affix a label to all primary caviar containers (i.e., in direct contact with the caviar) since 2002. Since 2004, member states have agreed to accept only imported caviar shipments that are marked according to the labeling guidelines. Since 2008 repackaging information has had to be included (year of repackaging/official registration code of repackaging plant/lot identification number, or CITES export permit number or re-export certificate number). Labels must be non-reusable, that is, they must not be able to be removed undamaged and transferred to another container. Alternatively, there must be visual evidence of any opening of the container.

CHALLENGES OF THE CURRENT CITES CAVIAR LABELING SYSTEM

In recent years, the following shortcomings of the caviar labeling system have been identified:

- Lack of standardization of label properties such as not being water- or abrasion-resistant and being made of basic paper.
- Poor print quality and small font size.
- Production of labels by caviar processing and repackaging companies.
- Vulnerability to counterfeiting.
- Difficulties in verifying label authenticity.
- Limitations of the information provided by the code, especially in cases of multiple repackaging, which results in a lack of traceability.
- Lack of enforcement of labeling standards.

Although surveys of the sturgeon caviar market are rare, a previous study (Jahrl et al., 2021) conducted in Romania, Serbia, Ukraine, and Bulgaria found that 29% of caviar samples were mislabeled. This included caviar that was sold without mandatory labeling, had incorrectly fixed labels, or had incorrect species codes. DNA and isotope analyses of samples from this survey that appeared to be correctly labeled revealed cases of mislabeling or fraudulent labeling (Ludwig et al., 2023). Of these mislabeled samples analyzed, 31 were found to originate from wild-caught sturgeons. In 24 cases, the wrong species was declared. Despite the labels being approved by the management authorities of the respective processing or repackaging countries, the labeling requirements were violated in 10 out of 15 samples of caviar with incorrect CITES codes, as the labels did not seal the contents. While labels can be checked for authenticity by visual inspection alone, only isotope and

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DNA testing can detect false declarations (Congiu, Striebel-Greiter, et al., 2023). It is also worth noting that authorities and customs officers rarely check the contents of “correctly labeled” caviar tins.

CURRENT CITES EFFORTS TO IMPROVE CAVIAR LABELING

In light of these limitations, the CITES Standing Committee set up an intersessional working group in 2022. The Secretariat also commissioned an analysis of the pros and cons of using QR codes as part of a universal labeling system (CITES CoP20 Doc. 65 2025).

The goals of this working group were to:

- Review the caviar labeling system set out in CITES guidelines, considering practical challenges in its implementation and opportunities to improve its functioning.
- Examine the analyses and recommendations of the Secretariat and the report on the use of QR codes in the universal caviar labeling system.
- Make recommendations to improve the functioning of the caviar labeling system.

The clear advantages of using QR codes in CITES caviar labels that could address the current system's drawbacks were identified, such as the size and readability of the codes, even in cases of degradation. However, concerns were raised regarding the ability of all CITES Member States to implement this technology at inspection points and the capacity of the caviar industry to implement QR codes at all stages of the production process. There were also concerns about the cost of implementing an information system. Due to these unanswered questions, the working group was unable to support replacing the current labeling system with QR codes. Consequently, the CITES Standing Committee encourages interested member states to carry out a pilot study testing the use of QR codes for caviar labeling, and to present the results to facilitate further discussions.

Having considered the pros and cons of the existing labeling system, we would like to suggest the following improvements to the current system:

- Increased quality, security, and fraud resistance of CITES labels with standardized paper and adhesive type, font size, and label size.
- CITES management authorities should strictly control labels, their quality, and their issuance. Companies should obtain labels exclusively from these authorities.

- Use of standardized electronic bookkeeping by caviar producers and processors, with codes submitted to a centralized database.
- A significant number of standardized, random genetic and isotope tests must be conducted in certified and authorized laboratories in each member state as required for species and source identification.
- A pilot project to test the practical use of QR codes.

While it is challenging to quantify the ultimate impact of the aforementioned abuses of the CITES labeling system, it is suggested that any fraud poses a significant risk to the survival of critically endangered sturgeons (Congiu, Gessner, & Ludwig, 2023) and adversely affects the image of the legal caviar trade. Therefore, improvements to the current labeling and control systems are necessary to prevent any further illegal caviar trade.

AUTHOR CONTRIBUTIONS

The manuscript was a joint effort between both authors.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

No new data were created or analyzed in this study. Data sharing is not applicable to this article.

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