

Data on the frog trade in the 20th century in Hungary

Tamás TÓTH^{1,4,*}, János GÁL¹, Nikolett VARGA⁴, László ALBERT⁴, and Borbála KOCSIS^{2,3,4}

1. University of Veterinary Medicine Budapest, Department of Exotic Animal and Wildlife Medicine, 1078 Budapest, István u. 2., Hungary

2. Behavioural Ecology Research Group, Center for Natural Sciences, University of Pannonia, Veszprém, H-8210, Hungary

3. ELKH-PE Evolutionary Ecology Research Group, University of Pannonia, Pf. 1158., H-8210 Veszprém, Hungary

4. Budapest Zoo & Botanical Garden, P.O. Box 469, 1371 Budapest, Hungary

* Corresponding author: T. Tóth, E-mail: toth.tamas@univet.hu

Received: 22 May 2022 / Accepted: 22 October 2022 / Available online: May 2023 / Printed: June 2023

Abstract. Although the consumption of frogs in Hungary was not unknown before World War II, it never became popular, so capturing for this purpose was also low. By the late 1920s, there was more interest in living specimens of these amphibians from foreign research institutes. In contrast, more significant capturing for consumption has occurred since the late 1950s, when the collected animals were exported mainly to France, Switzerland, Italy and the former Federal Republic of Germany. In the 1960s, Hungary exported 100-130 000 kg of frogs to these countries several times a year, which meant that about 2-2.5 million individuals were captured annually. According to some sources, in the early 1970s, this amount reached 1 million kilograms. This activity mainly affected edible frogs (*Pelophylax kl. esculentus*), marsh frogs (*Pelophylax ridibundus*) and pool frogs (*Pelophylax lessonae*), which could easily be confused with edible frogs. The capture and export of frogs ended in 1974 when all Hungarian amphibian and reptile species became protected.

Keywords: catch, collection, export, frog, Hungary, trade.

Introduction

It was a widespread practice to collect large quantities of several amphibians, including frogs, from the wild for various purposes (Das 2012, Çiçek et al. 2020). A thorough overview of the subject is given by Das (2012), who reviewed which frog species were used in which countries for religious reasons, medicinal (quackery) purposes, or food. For the latter purpose, these amphibians are mainly consumed in Asian and South American countries, but as Das (2012) reveals, there is a demand for this food source in European countries and North America as well.

Especially in the 20th century, more developed European countries imported large quantities of frogs for consumption, and among the exporters, there are Southeast European countries such as Turkey, Bulgaria and the former Yugoslavia (Anonymus 1983, Ljubisavljević et al. 2003). In Europe, France, Italy, Germany and Switzerland were among the largest buyers (Anonymus 1967a, 1967c, GY. Z. 1967, Ljubisavljević et al. 2003), and mainly pool frogs (*Pelophylax lessonae*), edible frogs (*Pelophylax kl. esculentus*) and marsh frogs (*Pelophylax ridibundus*) were exported. In addition, there is also data available on the collection and consumption of agile frogs (*Rana dalmatina*) and common frogs (*Rana temporaria*) in Central Europe (Vásárhelyi 1965). Among the exporting countries, detailed information is available from the former Yugoslavia, the Southern neighbour of Hungary, where frogs were exported between 1928 and 1999. Between 1935 and 1976, during the most active period of trade, a total of 6312.2 tons of live frogs were exported to eight countries which are, calculated with an average of 60g per frog, equal to approximately 105.2 million specimens (Ljubisavljević et al. 2003).

Similarly, in the 20th century, a large number of frogs were collected from the wild in Hungary and exported to Western European countries. This practice continued until 1974, when all species of amphibians and reptiles received legal protection in Hungary (Pénzes 1991). Although decades of commercial collection of frogs have not led to the

extinction of any species in the country, these actions have intensified the harmful effects of habitat loss, conversion and fragmentation, pollution and pesticides used in agriculture on amphibian populations. This article aims to summarise and organise data available on frog collection and export in Hungary, focusing on the 20th century.

Material and methods

The authors collected and systematised data on frogs caught in Hungary for commercial purposes from the 20th century by collecting literature and statistical data, mainly from hunting papers and journals. All the available information was discussed around the following topics; the beginning of frog collection, methods of capture, transportation, grading and storing ready-to-cook animals, export timing, facilities storing live animals, focus areas of collection, export demand, artificial breeding and nature conservation aspects of the collection. Furthermore, when prices in the literature were given in foreign currency, those were converted to HUF based on data available on the official website of the Hungarian National Bank in the given years. When no exchange rate data were available for the years in question, the price was calculated as the average of the two closest exchange rates. For amounts where just the number of individuals was available, the amount in kg was calculated with 60g per animal (Ljubisavljević et al. 2003).

Results and discussion

The frog exports began in 1929 when Frigyes Verzár from the University of Debrecen published an article in a German journal. He praised the suitability of Hungarian frogs for experimental purposes (Anonymus 1934). As a result, the interest of foreign institutes in frogs from Hungary increased, and the Institute of Physiology of the university received orders for live specimens from several foreign partners, of which 12 000 animals were exported between September 1933 and May 1934 (Anonymus 1934). In the post-World War II period, frogs were no longer exported to research institutes but mainly for food. Although the

collection of frogs for consumption existed before 1953, it was used to a small extent and to meet the needs of the small Hungarian market (Szánthó 1954).

Capturing frogs was considered fishing under the Fisheries Act, so according to the law, only those with a state fishing license or a territorial permit from the area's owner could engage in this activity (Csapkovits 1964). In contrast, Vásárhelyi (1965) found that most lone frog collectors had no permits for this work. The frog capturers used the following methods for collection: large trawls (Szánthó 1954, Anonymus 1965b), by hand when draining fishponds (Vásárhelyi 1965), with small scoop nets (Anonymus 1961a), a special scoop net baited with red cloth (Écsedi 1934, Szűcs 1965), with flashlights during the night (Anonymus 1965a), with groping and raking (Csapkovits 1964, Vásárhelyi 1965), with a piece of plank on a pole with nails (Écsedi 1934) and with hooks baited with red cloths (Vásárhelyi 1965).

From 1953, the export of these amphibians to Western European countries became significant (Szánthó 1954). Most frogs caught for export were transported to France, Switzerland, Italy and the former Federal Republic of Germany (Szánthó 1954, Gyapai 1957, G.P. 1962, Csapkovits 1964, Szűcs 1965, Rác 1966, Anonymus 1963a, 1965c, 1966b, 1967c, 1967d, 1969a, 1971, Galla-Kovács 1969, Maros 1971), in which the former Yugoslavia was Hungary's most significant competitor (Túri 1957).

After the emergence of significant western import demand in Hungary, mostly the leading producer cooperatives collected frogs. These organizations also took over and stored live animals from smaller groups until the arrival of foreign partners or MAVAD (Hungarian Game Trade Cooperative, and later Company, Magyar Vadkereskedelmi Szövetkezet, and later Vállalat in Hungarian) transporters (Anonymus 1968). Thus, in the 1950s, a working group rented out an area from the agricultural cooperative for capturing frogs, which also took over the living goods (Szánthó 1954), while in other cases, the members of the Pioneer movement also took part in the collection (Anonymus 1963a).

The frogs were sometimes graded at the producer cooperatives, while other times at the MAVAD site in Budapest or stored in cellars until transported abroad (Szánthó 1954, Anonymus 1965d). From 1972 they were hibernated to 5 °C in the Vecsés site of MAVAD and were exported from there (Anonymus 1972). Initially, the live animals were transported abroad by rail and road in insulated trucks, and later by refrigerated wagons or aeroplanes (Szánthó 1954, Gyapai 1957, Anonymus 1964, 1967d, 1967e, Rác 1966). During the transport, the frogs were stored in wicker baskets, sewn with bags (Molnár 1969), or packed in perforated wooden crates per 10 kg (Rác 1966) or 20 kg (Vásárhelyi 1965); in the latter cases, MAVAD provided the crates and the freight cost too (Csapkovits 1964).

From 1968 the importer countries asked the Hungarian side for ready-to-eat thighs (Anonymus 1969a). Therefore, MAVAD, sometimes together with the producer cooperatives who collected the animals, had cold stores built, where the thighs were packed in plastic bags and then in cardboard boxes and were frozen in blocks, as was the case at the facilities in Biharugra and Szajol facilities (Cs. M.

1967, Anonymus 1969a, 1975, Galla-Kovács 1969, Maros 1971). Regarding the Szajol facility, Maros (1971) stated that only frog legs for the domestic market were packaged in the cold store because later, the foreign partners were only willing to buy live frogs again.

Although MAVAD purchased catches from agricultural cooperatives and pond farms throughout the year, delivery timing proved to be an essential factor, as foreign buyers paid different amounts for frogs at different times, which was reflected in MAVAD's purchase prices (Anonymus 1964).

Opinions differed on when frog legs taste better. According to some views, they were the best before the mating season, while others believe that they could be consumed all year round; however, they could contain flukes (*Distomum*), which are not harmful but are foul-tasting (Anonymus 1949, Vásárhelyi 1965).

Importers paid the highest amount for live frogs in the winter, and due to the cold weather, competition and mortality rates were also the lowest (Anonymus 1965b). Therefore, the transport dates were adapted to the annual cycle of the animals for years, and the winter exports took place mainly in the late autumn and winter months (Anonymus 1957, 1967a). Gy. Z. (1967) mentioned that in January-February 1967, only Hungarian frogs were available on the French and Swiss markets. In contrast, G. P. (1962) reported high demand and purchase prices mainly in the summer.

Although the data showed that the purchase prices and transport conditions were the most favourable during the winter, catching frogs in the wild was not possible at that time. Therefore, artificial frog ponds surrounded by fences were established in the agricultural cooperatives, where animals caught throughout the year were stored until transport (Anonymus 1965b). In the frog lakes, leaks were made during winter, and the water was artificially circulated to improve its oxygen supply (Rác 1966, Anonymus 1967c). In the autumn of 1964, the Bocskai Fishing Agricultural Cooperative in Hajdúszoboszló established a 1-acre lake suitable for frog storage (Anonymus 1965b, Szűcs 1965, Antalffy 1965), while a few years later Anonymus (1966a, 1967c) Rác (1966) and Galla-Kovács (1969) have already known about two such lakes at this agricultural cooperative. Rác (1966), Cs. M. (1967) and Maros (1971) also mention similar frog lakes, which the Szolnok Liberation Fishing Agricultural Cooperative owned.

Capturing frogs resulted in different catch results depending on techniques, local options, collection period and the number of experienced participants. For example, according to Rác (1966), more skilful frog collectors could catch up to 300kg of these amphibians daily. In addition, Anonymus (1968) reported a three-member brigade that caught a total of 1 800kg of frogs in a week, while Maros (1971) mentioned a fisherman around Szeged who caught 7 000kg of frogs alone in 1970, and there was a month when he caught 3 000kg of these amphibians.

Specimens' size limits mainly ranged from 30 – 100g (Túri 1957, Gyapai 1957, Anonymus 1958a, 1958b, 1958c, 1961a, 1967c, G. P. 1962, Vásárhelyi 1965, Rác 1966) with a few exceptions for upper size limits of 150g (Csapkovits 1964) and 200g (Rác 1966).

The purchase prices (shown in Table 1.) were also characterised by constant changes, mainly related to supply and demand, inflation and the delivery period (Anonymus 1958a, 1961d, 1965b, 1967d, 1968, Antalffy 1965, Csapkovits 1964, Éliás 1968, Galla-Kovács 1969, G. P. 1962, Rácz 1966). It usually ranged between HUF 10-30/kg (Csapkovits 1964, Gy. Z. 1967); however, Éliás (1968) and Anonymus (1965d) also noted that foreign buyers generally paid double the amount for frogs compared to domestic fish.

Data show that collecting frogs did not spread equally throughout the country either; it was localised to certain parts of Hungary. G. P. (1962) believes that most frogs were collected for MAVAD in the counties of Jász-Nagykun-Szolnok, Hajdú-Bihar, Szabolcs-Szatmár, Békés and Csongrád. Among MAVAD's largest suppliers was the Bocskai Fishing Agricultural Cooperative in Hajdúszoboszló (Anonymus 1966a, 1967b, 1967c, 1967d, 1970a, 1970b, Antalffy 1965, Rácz 1966, Szűcs 1965), which had its brigade of 40 persons to collect frogs. The cooperative has managed the collection and selling of the animals since 1964 (Anonymus 1967d), shown in Figure 1.

In addition, data is sparsely available on other cooperatives and professional groups handling the collection, purchase and export of frogs (Anonymus 1958b, 1963b, 1968, 1969a, 1969b, G. P. 1962), as shown in Figure 2.

Table 1. Varying purchase prices are shown during the years and seasons; prices highlighted in italics and bold represent prices paid in another currency, converted into HUF.

Year and season	Purchase price/ kg
1958	9 HUF
1961	11 HUF
1962 June - August	25 HUF
1962 October - November	10 HUF
1963 1 st of January - middle of May	16 HUF
1963 middle of May - middle of October	20 HUF
1963 middle of October - end of October	15 HUF
1963 end of October - middle of December	10 HUF
1963, from the middle of December	20 HUF
1965	28 HUF
1966	28 HUF
1967	<i>11.7 HUF</i>
1968	15.5 HUF, 25.38 HUF
1969	60 HUF
1989	315 HUF

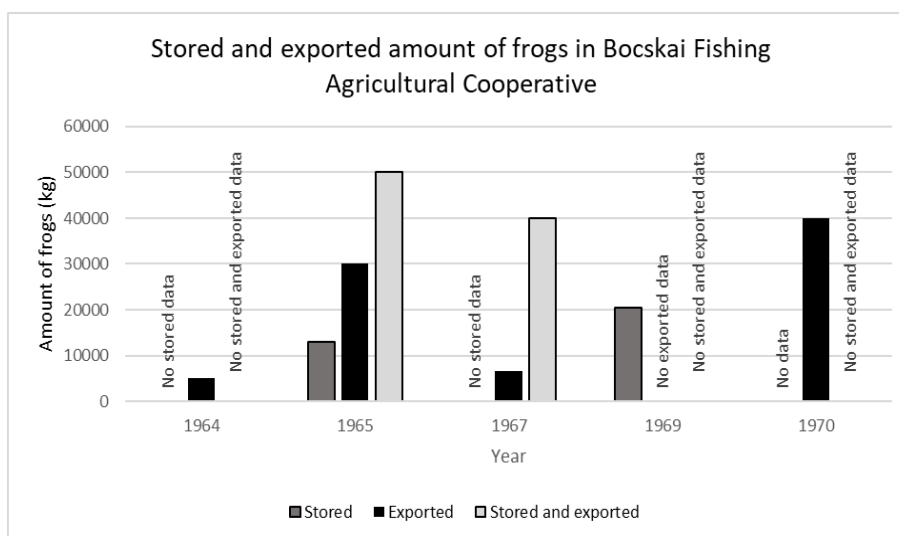


Figure 1. Amounts of frogs collected and stored for export in Bocskai Fishing Agricultural Cooperative in Hajdúszoboszló between 1964 and 1970. There was no data available for each year and each category.

Furthermore, in 1967 the Marcali Agricultural Cooperative also organised groups to collect frogs (Gy. Z. 1967); however, no further data was available on the amounts.

Following World War II, Hungary had an increased demand for convertible currencies. Thus, the governments encouraged companies and workers to achieve the highest possible numbers in the sectors where items sought by Western states were exported. This was also the case for frog exports, where according to Maros (1971), there would have been a demand for all quantities in the importing countries, while G. P. (1962) could quantify the demand for 200 000kg

more than Hungary could supply. In addition, Anonymus (1961c) reported that the target for fishing agricultural cooperatives was collecting 150 000kg of frogs for 1961, which would mean exporting about 3 million animals. According to Anonymus (1961d), the majority of this quantity was expected to be delivered by three agricultural cooperatives; the Szolnok Liberation Fishing Agricultural Cooperative with 50 000kg, the Storm Corner Fishing Agricultural Cooperative in Gyoma with 25 000kg and the Bocskai Fishing Agricultural Cooperative in Hajdúszoboszló with 25 000kg. According to Anonymus (1967d), 140 000 to 150 000kg of frogs were also planned to be exported in

foreign trade by 1967. No detailed data is available from each year on export numbers; however, summarised export numbers (Anonymus 1961e, 1964, 1965c, 1966b, 1983, Gy. Z. 1967, Ráthonyi 1964) are available, as can be seen in Figure 3.

Based on this, the demand could be fulfilled. Holdas (1990) stated that there were periods when the country had annual revenues from frog exports of 10-11 million USD, which seems an overestimation in light of the above data.

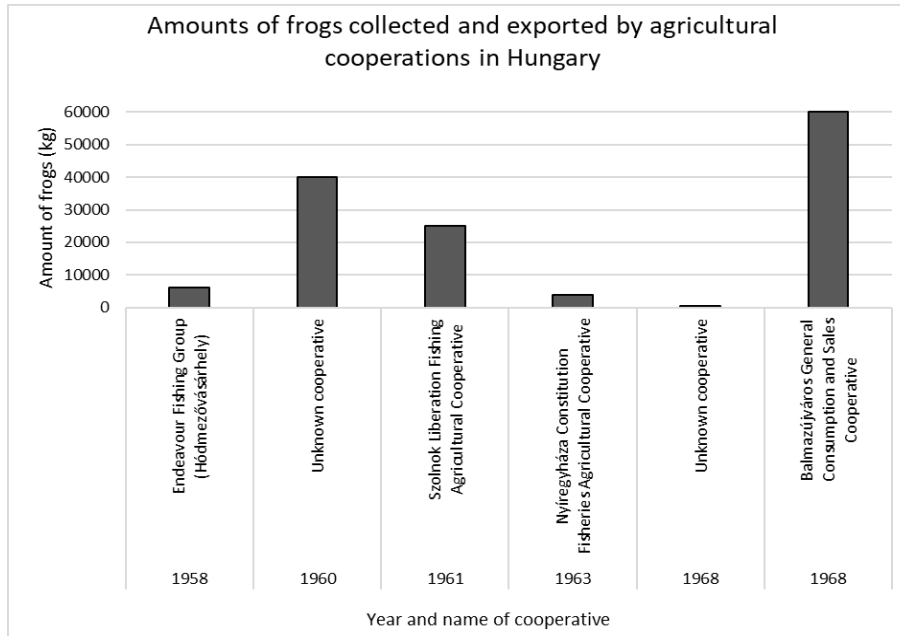


Figure 2. Data of the amounts of frogs collected and exported by agricultural cooperations in Hungary between 1958 and 1968. There was no data available from each year.

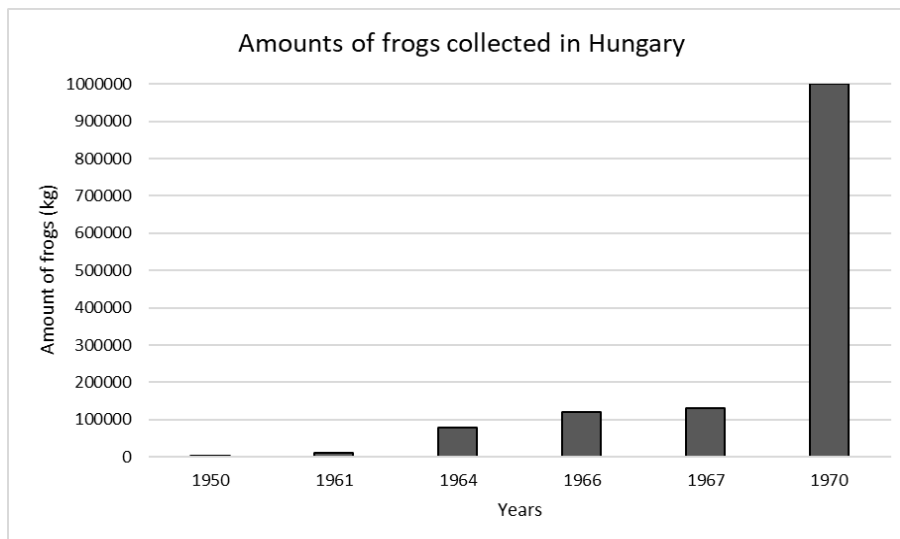


Figure 3. Yearly amounts of frogs collected in Hungary between 1950 and 1970. There was no data available from each year.

Frog breeding has also been attempted in many countries worldwide to meet growing consumption needs, and farms in many countries still exist today (Pahor-Filho et al. 2019, FAO 2021, Laufer et al. 2021, Ribeiro & Toledo 2022). In Hungary, the idea of large-scale breeding emerged, but the most significant challenge was feeding the animals, as they consumed only live prey (Szánthó 1954, Maros 1971). For example, in the Szeged Liberation Agricultural

Cooperative, MAVAD planned to establish 30-40 rectangular frog-filled lakes filled with water from nearby heat sources, and since they would not have frozen in winter, the frogs could have been exported at 1.5 years old instead of 3 (Anonymus 1961b, 1961d). The Bocskai Fishing Agricultural Cooperative in Hajdúszoboszló also had outdoor breeding plans (Anonymus 1965b), but no information is available on the implementation of the facilities.

In addition, Montskó (1987) and Anonymus (1987) report that in the 1980s, János Ságody developed and patented the method of indoor frog breeding using hormones, which allowed the animals to reproduce more times annually than in the wild. In addition, Dr Mihály Varga, assistant professor at the University of Agricultural Sciences in Debrecen, also experimented with breeding frogs (Joó 1990), but these attempts proved unsuccessful (Anonymus 1987, Montskó 1987, Pethes 1989).

The export of Hungarian frogs was also discussed to strengthen foreign frog populations in some cases. For example, Anonymus (1971) mentioned that frogs were introduced to Kent and Sussex in Great Britain in 1930 but went extinct; however, the author did not provide any other information about this project. In addition, Montskó (1987) mentioned that the Scandinavian countries would have liked to buy frogs from Hungary to strengthen their European tree frog (*Hyla arborea*) populations, which have become rarer due to acid rain, while Anonymus (1987) was informed that by 1988, the countries above announced their need to purchase a total of 10 million frogs for this purpose.

Regarding the regulation of collecting frogs, Szabó (1959) has already formulated proposals to protect populations. He considered that capturing edible and pool frogs for domestic consumption and exporting them should happen only with the permission of the Nature Conservation Council (Természetvédelmi Tanács in Hungarian), which should include the place and time of collection and the collectable number or weight of frogs. He also suggested that the authorities carry out random checks on the activities of collectors. Szabó (1959) also pointed out that a catch ban should be introduced during the breeding season, i.e. usually between the 15th of May and the 15th of June, and frog collectors should not damage eggs during collection.

Vásárhelyi (1965) pointed out the harmful and cruel collection practices, which raised conservation and animal welfare concerns. According to him, the collection would not have decreased the population, as MAVAD only takes over frogs within a size limit. In contrast, according to Vásárhelyi (1965), when the agricultural cooperation workers classified specimens below and above the size limit, the frogs were beaten to death and thrown away on the spot.

The commercial collection of frogs was terminated in 1974 by Resolution 290/1974 of the National Nature Conservation Office (Országos Természetvédelmi Hivatal in Hungarian), which declared all domestic amphibian and reptile species protected (Pénzes 1991). In addition, in the early 1970s, the frog business made less and less profit and began to reach the break-even level, with Turkish and Bulgarian suppliers transporting frogs abroad much cheaper, with MAVAD stopping exports (Anonymus 1983).

Conclusions

In Hungary, before World War II, only small numbers of frogs were caught, mainly for domestic and foreign research institutes and health care purposes, some for consumption purposes too, but the role of these amphibians in Hungarian gastronomy was never significant. From the 1950s onwards, there was significant demand from Western European

countries, mainly for imports for consumption. The species for this purpose were mainly edible frogs (*Pelophylax kl. esculentus*) and marsh frogs (*Pelophylax ridibundus*), and pool frogs (*Pelophylax lessonae*), which are two species that could easily be confused with the edible frogs. The acquiring companies were mainly from France, Italy, Switzerland, and the Federal Republic of Germany. In addition, we have sporadic data on foreign demand for the conservation of domestic frogs for nature conservation purposes.

Consignments caught and exported for consumption were mainly exported abroad as live animals; later ready-to-eat frozen products became available. Most of the catches were limited to a few counties where agricultural cooperatives and their specialist groups carried out the collection. Foreign buyers set the size limits within which they took over the frogs, and the purchase price depended not only on the quality of the goods and the type of transport but also on the time of year, so over time, live frogs were stored in ponds built for this purpose until delivery.

Hungary could export up to 130 000kg of frogs in the 1960s, which estimates the collection of about 2-2.5 million individuals a year. This number did not include the large number of individuals killed below and above the size limit, for which no data or estimates were available. In addition, given that the collections concentrated on only a few counties, this activity may have had a significant negative impact, at least locally, on some Hungarian populations of these species.

The capture and export of frogs ended due to the declining income-generating capacity of the sector and the No. 290/1974 resolution of the National Nature Conservation Office in 1974, which protected all amphibian species in Hungary. Although many people have experimented with artificial breeding based on patented methods, these attempts have not proved successful and profitable in the long run, so they stopped these activities.

References

- Anonymus (1934): Emelkedik a kecskebéka-export. Kis Újság 47: 7.
 Anonymus (1949): Megkedvelik a békacombot - jósolja a lágymányosi „delikát-vadász”. Kis Újság 3: 6.
 Anonymus (1957): Kecskébékát exportálunk. Esti Hírlap 3: 7.
 Anonymus (1958a): Békaexport Vásárhelyről. Csongrád Megyei Hírlap 3: 4.
 Anonymus (1958b): Százezer kecskebékát exportálnak Hódmezővásárhelyről. Esti Hírlap 3: 1.
 Anonymus (1958c): A külkereskedelmi vállalatok hírei. Külkereskedelem 2: 24.
 Anonymus (1961a): Október 8-án kezdődik a vadászati idény. Eredményes békahalászat. Csongrád Megyei Hírlap 6: 3.
 Anonymus (1961b): Békaóvoda. Esti Hírlap 6: 1.
 Anonymus (1961c): Kecskébeka exportra. Esti Hírlap 6: 1.
 Anonymus (1961d): Békaóvodát. Hétfői Hírek 5: 6.
 Anonymus (1961e): Megindult a kecskebeka exportja. Népszabadság, 19: 15.
 Anonymus (1963a): A kecskebékák, éticsigák felvásárlását. Népszabadság 21: 10.
 Anonymus (1963b): 38 mázsa kecskebékát. Népszabadság 21: 10.
 Anonymus (1964): Reptülnek a kecskebékák. Hajdú-Bihari Napló 21: 4.
 Anonymus (1965a): A szegedi békavadászok. Esti Hírlap 10: 4.
 Anonymus (1965b): 50 mázsa béka-exportra. Hajdú-Bihari Napló 22: 1.
 Anonymus (1965c): Békaneveldek. Hétfői Hírek 9: 4.
 Anonymus (1965d): Export. Képes Újság 6: 3.
 Anonymus (1966a): Félmillió béka exportra - Hajdúszoboszlóról. Hajdú-Bihari Napló 23: 1.
 Anonymus (1966b): 120 ezer kiló kecskebeka. Magyar Nemzet 22: 4.
 Anonymus (1967a): Franciaországba folyamatosan szállítunk éticsigát és

- kecskebékát. Figyelő 11: 9.
- Anonymus (1967b): Békaexport Franciaországnak. Hajdú-Bihari Napló 24: 1.
- Anonymus (1967c): Békaszállítmány Hajdúszoboszlóról külföldre. Hajdú-Bihari Napló 24: 1.
- Anonymus (1967d): Növekvő békaexport. Népszabadság 25: 9.
- Anonymus (1967e): Növekvő békaexport. Népszabadság, 25: 9.
- Anonymus (1968): 215 mázsa kecskebéka. Hajdú-Bihari Napló 25: 5.
- Anonymus (1969a): Gazdaságok tapasztalatai. Figyelő 13: 11.
- Anonymus (1969b): 650 mázsa kamillát vásároltak fel Balmazújvároson. Hajdú-Bihari Napló 26: 3.
- Anonymus (1970a): A békák jég alatti lehalászását. Magyar Nemzet 26: 4.
- Anonymus (1970b): Rekord békatermést. Népszava 98: 9.
- Anonymus (1971): A VG jelenti. Világ gazdaság 3: 2.
- Anonymus (1972): A MAVAD központi telepét. Népszabadság 30: 8.
- Anonymus (1975): Konyhakész vadkacsa, fűj és békacomb. Népszabadság 33: 9.
- Anonymus (1983): Magyar béka. Magyar ifjúság 27: 12.
- Anonymus (1987): Cím nélkül. Zalai Hírlap 43: 3.
- Antalfy, L. (1965): Békafarm Hajdúszoboszlón. Magyar Vadász 18: 13.
- Çiçek, K., Ayaz, D., Afsar, M., Bayrakci, Y., Pekşen, C.A., Cumhuriyet, O., Ismail, I.B., Yenmiş, M., Üstündağ, E., Tok, C.V. (2020): Unsustainable harvest of water frogs in southern Turkey for the European market. *Oryx* 55: 364-372.
- Cs. M. (1967): A békaexport alakulása. Magyar Vadász 20: 2.
- Csapkovits, M. (1964): Kutykurutty - száll a békaszere nád... Magyar Vadász 17: 2.
- Das, I. (2012): Man meets frog: perceptions, use and conservation of amphibians by indigenous people. pp. 1-18. In: *Amphibian Biology. Conservation and Decline of Amphibians: Ecological Aspects, Effects of Humans, and Management*, 10. Oxford University Press.
- Ecsedi, I. (1934): A Debreceni Déri-Múzeum évkönyve 1933. Népies halászat a Közép-Tiszán és a tiszántúli kisvizéken. Békázás. Városi Nyomda, Debrecen.
- Éliás, A. (1968): Mezőgazdasági termékeink a világpiacon. Élet és Tudomány Kalendárium, 6: 200-204.
- FAO (Food and Agriculture Organization) (2021): Global Aquaculture Production 1950-2018. Fishery Statistical Collections. <<http://www.fao.org/fishery/statistics/global-aquaculture-production/en>, accessed on 03.08.2022>
- G. P. (1962): 1 kiló pióca = 1 mázsa cukor. Népszabadság 20: 11.
- Galla-Kovács, Á. (1969): Kecsebéka felmászik az exportlistára. — Jó pénz a vadásznak és a csigagyűjtőnek. — Békacombüzem épül Szolnokon. Magyar Hírlap 2: 7.
- Gy. Z. (1967): A MAVAD apróckikerei. Magyar Vadász 20: 2.
- Gyapai, D. (1957): A brekegő export és a többiek. Nagy Kalendárium 1958: 140-141.
- Holdas, S. (1990): Biológia az állattenyésztésben. Természettudományi Közöny 119: 434-437.
- Joó, E. (1990): Vásárhelyi ötlethyáros - békaugrásban. Csongrád Megyei Hírlap 47: 6.
- Lauffer, G., Gobel, N., Berazategui, M., Zarucki, M., Cortizas, S., Sopotullo, A., Martinez-Debat, C., De Sá, R.O. (2021): American Bullfrog (*Lithobates catesbeiana*) diet in Uruguay compared with other invasive populations in Southern South America. *North-Western Journal of Zoology* 17: 196-203.
- Ljubisavljević, K., Džukić, G., Kalezić, M.L. (2003): Green frogs are greatly endangered in Serbia and Montenegro. *Froglog -Newsletter of the Declining Amphibian Populations Task Force* 58: 2-3.
- Maros, D. (1971): Békahalászat. Népszabadság 29: 2.
- Molnár, Gy. (1969): Népi halászat Konyáron. *Ethnográfia* 80: 107-119.
- Montskó, É. (1987): Békakonzert a harmadik emeleten. Magyar Nemzet 50: 5.
- Pahor-Filho, E., Mansano, C.F.M., Pereira, M.M., De Stéfani, M.V. (2019): The most frequently bullfrog productive systems used in Brazilian aquaculture: A review. *Aquacultural Engineering* 87: 102023.
- Pethes, J. (1989): Tóba ugrasztott vállalkozók. Szeretni kell a békát! Népszabadság 47: 7.
- Pénzes, B. (1991): Kételtűek, hullók a lakásban. Mezőgazdasági Kiadó, Budapest.
- Rác, B. (1966): 130 mázsa békát exportál a szoboszlói halászszerkezet. Hajdú-Bihari Napló 23: 1.
- Ráthonyi, J. (1964): Duda Pajti, a puli, a kutyatudományok „doktora”. *Esti Hírlap* 9: 5.
- Ribeiro, L.P., Toledo, L.F. (2022): An overview of the Brazilian frog farming. *Aquaculture* 548: 737623.
- Szabó, I. (1959): A herpetofauna védelme külföldön és az erre vonatkozó hazai javaslat. *Állattani Közlemények* 47: 155-159.
- Szánthó, D. (1954): Brekegő export. Béke és Szabadság 5: 8.
- Szűcs, L. (1965): A fehér amur növényevő hal. 900 mázsa ponty. Kecsebéka exportra. Hajdú-Bihari Napló 22: 1.
- Túri, A. (1957): Hatmillió csiga elindul és békák, rákok és piócák követik. *Esti Hírlap* 2: 1.
- Vásárhelyi, I. (1965): A kételtűek és hullók hasznáról, káráról. Mezőgazdasági Kiadó, Budapest.