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Goldfish Ethnozoology in Kasepuhan Citorek as Biology Learning Content

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Abstract

Indonesia has a diverse range of freshwater fish species, making it possible for people to cultivate them. Goldfish are among the most economically valued freshwater fish species. Goldfish can be cultivated traditionally, as demonstrated by the indigenous people of Kasepuhan Citorek Lebak, Banten Province, who continue to practice traditional natural resource management. This project aimed to investigate goldfish farming utilizing an ethnozoological strategy to develop goldfish potential in the Kasepuhan Citorek and use it as the biology learning content. This study has been conducted in January 2024. Data were gathered through observation, in-depth interviews, and document analysis. Data analysis is carried out in a systematic manner using the triangulation technique. The results of the study found that the process of cultivating Sinyonya and Kumpai goldfish types in the Kasepuhan Citorek area still follows the customs for generations by utilizing the surroundings and can be used as the learning content in biology learning for grade ten senior high school in the basic competencies of biodiversity and ecosystem studies. Goldfish are kept in cages along the river. Kijing and rice field snails constitute 90% of their daily diet. The spawning process of one female with three or four male goldfish on the rice field can be harvested eight months later. Goldfish farming gives considerable economic benefits to the indigenous inhabitants of Kasepuhan Citorek.The uniqueness of goldfish cultivation in Kasepuhan Citorek, it can be concluded that this study can be recommended used as a biology learning content of ecosystem and biodiversity studies in senior high school level.

Keywords: Ethnozoology, Goldfish, Kasepuhan Citorek, Biology Learning, Learning Content

INTRODUCTION

Studies on biodiversity and natural resource management as a worldwide issue that impacts society on a personal, local, and global level are covered in biology, a required subject in Indonesian high schools. In biology content, specifically, the concepts of ecosystem and biodiversity in the tenth grade of Senior High School, the biology concept that effectively fosters an educational experience that is in line with ethnozoological studies on goldfish in Kasepuhan Citorek can be utilized as a learning content. Through a method based on local wisdom, meaningful biology learning can emerge from pertinent experiences encountered in daily life (Silaban & Sriyati, 2024).

Goldfish farming is a traditional method of managing natural resources in the Kasepuhan Citorek area of Lebak, Banten Province. This presents an opportunity for the ethnozoological concept of goldfish cultivation to be recommended for biology teaching materials. However, when it comes to understanding, belief, perception, and local language, for instance, integrated social systems and ecosystems present challenges to finding of

ethnozoology-based knowledge (Helida, 2021). Discovering how indigenous peoples manage their environments is scientific knowledge that can be used in biology lessons (Alimah, 2019). This study verifies the findings of Carolina *et al*. (2024), which show that ethnoscientific research successfully instructs biology by applying problems that are absorbed through experience. Indigenous peoples' understanding of nature protection becomes an ethnobiological research that applies to everyday life (Saro *et al*., 2023).

Indonesia is recognized for its wide seas, which result in a large diversity of fish species. The diversity of marine and freshwater fish species is vast, and people can use them in various ways, including cultivation. The community can use freshwater waters for freshwater fish farming and the sea as a resource (Tarihoran, 2018). The goldfish group (*Cyprinus carpio*) is one of the opportunities and advantages that freshwater aquaculture offers the community (Sihombing & Darus, 2021). Goldfish farming can utilize both traditional and modern methods, which vary greatly depending on the peculiarities of the planted area.

In general, in regions where these traditional practices are still used, the community has its own idea of managing biological resources traditionally. For example, the indigenous people of Kasepuhan Citorek continue to retain natural resource management norms. The daily lives of these Indigenous people use traditions for generations, according to socio-cultural norms, namely "tatali paranti karuhun" where people follow, obey, and obey the secret guidance of life like karuhun who have values not only at the religious level but also reflected in social institutions, leadership systems, and procedures for interacting with nature (Sabrina *et al*., 2020). The traditional tradition of managing biological resources for generations in Kasepuhan Citorek can be seen in carp farming. The traditional tradition of managing biological resources for generations in Kasepuhan Citorek can be seen in goldfish farming.

Goldfish is a popular freshwater fish because of its high protein content (16.9-18.6%) and savory flesh flavor (Mumpuni & Farastuti, 2023; Fajarwati & Andriani, 2022). Goldfish have significant economic value if correctly farmed due to their stress resilience and adaptability to different environments (Linhartová *et al*., 2018). Majalaya, Punten, Sinyonya, Domas, Red/Cangkringan, Kumpai, Punten, Taiwanese, Glass, and red carp are some of the most commonly cultivated goldfish species. Sinyonya and Kumpai are two types of goldfish that the indigenous people of Citorek Kasepuhan farm. Sinyonya is one of the leading commodities for freshwater fish cultivation in Pandeglang Regency, Banten Province (Hermawan *et al*., 2023). Besides being used for consumption, Sinyonya goldfish are also widely sold as ornamental fish. Furthermore, the Kumpai goldfish is much sought after

because of its beauty as an ornamental fish with its exotic morphology and color (Fathimah *et al*., 2022). Both are typical types of cultivated goldfish in the Kasepuhan Citorek area.

Goldfish farming habitats generally include ponds, rice fields, reservoirs, or cages in public waters or rivers (Pranata *et al*., 2022). Goldfish farming in Kasepuhan Citorek continues to use traditional methods, beginning with the spawning process and habitat placement, meaning cultivating carp in cages (*kerangkeng*) along the Citorek River. Using river flow for carp farming activities is one of the cultural qualities that Kasepuhan Citorek has preserved to this day. In addition to natural settings, most feed sources in fish farming continue to employ natural feed. Natural feed availability is significant in fish farming since it provides many nutrients due to its caloric content (Mumpuni & Farastuti, 2023). This is undoubtedly beneficial to the growth of farmed carp in the Kasepuhana Citorek area, where good feed needs include nutritional content, availability, and non-toxicity (Putranti, 2015).

Sinyonya and Kumpai goldfish farming benefits the Indigenous people of Kasepuhan Citorek as economic support because it has high economic value. Therefore, this study aims to explore goldfish farming using an ethnozoological approach in the Kasepuhan Citorek and use it as the biology learning content in the high school level, specifically the concepts of ecosystem and biodiversity.

METHOD

This research activity has been conducted in Kasepuhan Citorek Lebak, Banten Province, Indonesia in January 2024. Kasepuhan Citorek comprises four villages, namely West Citorek, East Citorek, South Citorek, and Central Citorek villages, covering 7,416 hectares. East Citorek Village was chosen as the center of research activities because it is the home of Kesepuhan Kaolot (Pupuhu), the head of the Citorek Kasepuhan Traditional wengkon, making it the location of traditional activities/events such as Seren Taun events, mass celebrations, and so on (Muhlisin *et al*., 2017).

East Citorek is a village located in Cibeber District, Lebak Regency, Banten Province, with an area of 400.9641 km2. The area has abundant springs, so the surrounding community uses it for daily needs such as drinking water, cooking, washing, irrigation of rice fields, and fish farming (Nugraheni *et al*., 2024). Most East Citorek Village population work in agriculture and farming, including rice growing and fish farming (Akbar *et al*., 2021). Figure 1 shows location research along the Citorek and Cimandur Rivers, which is ideal for farming fish and goldfish.

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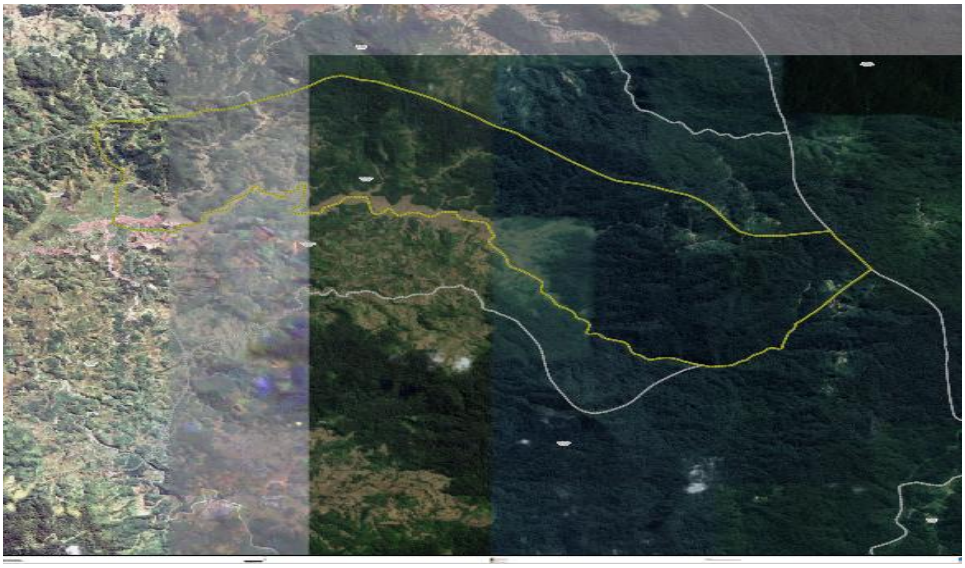

Figure 1. Map of East Citorek Village (Source: Balai Desa Citorek Timur, 2021)

Data and Data Analytics

Field notes, in-depth interviews, and document analysis were used as data collection strategies to trace primary data on goldfish farming, which has been performed for generations in the indigenous Kasepuhan Citorek village, to follow-up observations.

Data analysis is presented descriptively through triangulation techniques by reducing data and regrouping into data that has certain concepts in common (Bogdan & Biklen, 1992). The respondents included in the study were appointed by representatives of traditional leaders, namely goldfish farming communities in the Kasepuhan Citorek area.

RESULTS AND DISCUSSION

Through in-depth interviews, the search for the carp farming community in the Kasepuhan Citorek area was conducted, and the flow of the rivers used for goldfish farming was traced. The topic of the conversation was goldfish farming, namely the spawning process, feeding, and use of the fish, as well as some details on how the indigenous Kasepuhan Citorek people raise goldfish.

Goldfish Spawning Process

Spawning Pond Preparation

The first process at the spawning stage is preparing the pond. For generations, the carp spawning process in Kasepuhan Citorek has been carried out by utilizing one part of the empty post-harvest rice field map measuring 3 meters x 2 meters filled with shallow water as high as 25 cm. At this point, the land map is given special treatment, which includes sprinkling salt over the rice field area to eradicate pests that may have been left behind in the post-harvest rice field. Salt (NaCl) has a role in softening the soil, which is related to the nutrient components contained in salt, especially Magnesium (Mg), Chlorine (Cl), micro

Sodium (Na), Calcium (Ca), Bromine (Br), Sulphur (S), Potassium (K), and Carbon (C), so that cations in the soil will be replaced by cations in salt (Handoyo *et al*., 2018).

Ijuk or coconut leaves are another item prepared during this spawning process; they serve as kakaban, allowing goldfish eggs to attach. Utilizing the substrate where the eggs are laid encourages the mother fish to hatch her eggs, raising the process's odds of success for both spawning and fish farming. Adequate medium greatly supports egg development, from cell division to the creation of fish embryos (Nurfitrirahim, 2013).

Prepare Broodstock

The brood selection technique used by fish farmers in Kasepuhan Citorek involves selecting potential parent fish weighing around 4 kilograms and showing indicators of reproductive maturity. The abdomen of potential male father fish secretes a milky white fluid when pushed, and they move nimbly. Meanwhile, unique features in females include an enlarged, flabby abdomen that, when compressed, seems to release yellow fluid. The spawning procedure is still conventional, with a ratio of three females to eight males. The indigenous people of Kasepuhan Citorek think that the most crucial treatment and upkeep during the spawning phase will decide the number and quality of fish produced. In one spawning process, about 3000 eggs are obtained. The spawning process lasts 10-12 months until the goldfish reaches a weight of 1 kilogram to be transferred into the *kerangkeng*.

Special Handling During the Spawning Process

The indigenous inhabitants of Kasepuhan Citorek know about alternative diets during the spawning stage, including dried buffalo dung combined with rice flour, which they believe will make the waters in the spawning pond more productive. This finding is consistent with Gunawan & Khalil (2015), who found that animal dung enhances fish spawning by organically multiplying phytoplankton growth. Phytoplankton contains polynutrients that contribute to fish growth, such as amino acids, fatty acids, enzymes, and vitamins, which are easily digestible by juvenile fish (Napiorkowska-Krzebietke, 2017). Adding rice flour to the feed mixture during the spawning phase aims to make the texture smoother and drier, preventing the feed from rapidly becoming moist and rotten. Rice flour in powdered foods is easily digestible and hypoallergenic (Nuraisyah *et al*., 2018). Compared to comparable foods like corn and ketella, rice flour has a higher carbohydrate content. However, aside from hemicellulose, cellulose, and beta-glucan starch levels, rice flour is also highly beneficial for promoting individual weight gain (Singh *et al*., 2020).

Due to economic factors, the Citorek indigenous kasepuhan community frequently uses rice byproducts such as rice bran or huut (local language) in household-scale freshwater fish

aquaculture. Furthermore, locals use domestic garbage, such as chopped cooked vegetables and leftover side dishes, as natural feed for fish in ponds near their homes.

Goldfish Cage

The spawning process lasts until the weight of the goldfish reaches 1 kilogram. Then, the fish will be transferred into *kerangkeng* in the shape of boxes. *Kerangkeng* are made independently by the community by relying on the availability of local wood raw materials, the most widely used type of wood for cages is rasamala wood. The abundance of rasamala around Mount Halimun Salak National Park, which is quite a lot, makes the indigenous people of Kasepuhan Citorek also use sturdy rasamala wood as a building material (Istomo & Sari, 2019). Cages that are 3-4 years old usually require wood replacement on damaged parts.

Kerangkeng dimensions range from 3 meters x 2 meters to 2 meters x 1 meter, with a capacity of 20 to 50 heads depending on the weight of the fish. One of the distinctive rituals in goldfish farming in Kasepuhan Citorek is that the cage door can be opened and closed, allowing goldfish to enter and exit the cage, indicated by the sound of wood being pounded to the water's surface.

The indigenous people of Kasepuhan Citorek use the river flow to cultivate Sinyonya and Kumpai goldfish. These fish will be placed in cages along the Citorek River, which originates at the Halimun Salak Mountain spring and flows into the Cimadur River (Figure 2). The continuous flow of the Citorek River acquires its distinguishing feature, and the lane used as a place for fish *kerangkeng* has become one of the tourist destination destinations.

Figure 2. Farmed Goldfish *Kerangkeng* Along the River (Source: Personal Documentation)

Goldfish farming has long made use of the environment, particularly river flows. This practice dates back many generations. Certain customary areas or areas adhering to their usual order experience the same situation. Like the Kasepuhan Cicarub customary region,

freshwater fish ponds have replaced rice fields (Widiati & Rusmana, 2020). Goldfish can naturally thrive in freshwater environments with shallow water depths and sluggish currents, such as rivers and lakes (Kurniaji *et al*., 2022). A plain has a pH of 7-8, a temperature of 25-30 degrees Celsius, and an elevation of 150-600 meters above sea level is suitable for goldfish growth. Because of this, goldfish are known for their adaptability (Yoviska *et al*., 2021).

Variety of Feed for Kumpai and Sinyonya Goldfish

Varieties of goldfish feed grown as pellets, rice snails, and kijing in the Kasepuhan Citorek indigenous community. However, kijing and rice snails make up to 90% of his daily diet (Figure 3). The vast rice fields and constant river flows provide an environment conducive to expanding this kind of mollusk population. Therefore, the community then uses it as goldfish feed. One factor that significantly affects a cultivation business's success is feed (Andriani *et al*., 2021). Generally, the kind of feed provided can impact the quality of fish raised in aquaculture. Crop yields are significantly impacted by the nutritional value of feed (Makmur, 2004). Of course, excellent nutrition promotes growth. Rice snails and kijing, abundant in rice fields and rivers, are one source of protein for goldfish feed. According to Agus *et al*. (2010), feed quality is defined by its nutritional content. High-nutrient feed that meets the needs of fish produces rapid growth and vice versa.

Figure 3. Types of Farmed Goldfish Feed in the Kasepuhan Citorek Indigenous People: Rice Snails (Left) and Kijing (Right) (Source: Personal Documentation)

The indigenous people of Kasepuhan Citorek understand how to harness their environment's potential. The existence of rice snails and *kijing*, which are easy to find, is one solution as an alternative to goldfish feed with better nutritional content. The research conducted by Baalu *et al.* (2018) tested gold snail feed for snakehead fish, which was previously not in demand because it was considered a pest. The findings revealed that the protein content of fish increased significantly, from 16 to 50%. This is consistent with the presence of rice snails, which are also rice plant pests in Kasepuhan Citorek but, if correctly

managed, have the potential to raise farmers' revenue and improve community nutrition. Furthermore, the community uses *kijing* as goldfish feed, readily available in rivers. According to Palinussa *et al*. (2021), *kijing* has a high survival rate and can be used to overcome water pollution caused by pollutants and function as a biofilter. Kijing can also be utilized for animal feed and industrial purposes.

Utilization of Goldfish Farming for the Indigenous People of Kasepuhan Citorek

Goldfish commodities in Kasepuhan Citorek have great potential for development; due to high market demand, the selling price of a typical Citorek carp now ranges between Rp 150,000 and Rp 190,000 per kilogram. Goldfish farming is expanding, using local resources in high market demand (Markisman *et al*., 2019). Citorek's usual goldfish customers are from Jakarta, Sukabumi, and Majalengka, among other places in Indonesia. Apart from being consumed, Citorek's common goldfish is also sought after for trading, pastimes, and collections. Customers want goldfish with an average weight of ± 5 kilograms.

Currently, many Kasepuhan Citorek indigenous people raise Sinyonya and Kumpai goldfish. As a result, nearly all locals own goldfish farming *kerangkeng*. Aside from farming, the Kasepuhan Citorek Indigenous people rely on goldfish farming for a living. The income from the Goldfish farming business can later reflect the level of welfare of the community. Of course, this is based on the community's strong thinking to preserve local wisdom in utilizing natural resources. Local wisdom is not only a characteristic of certain communities but also an effort to maintain the ecological environment of the community. According to the research of Carolina *et al*. (2024), the reconstruction of indigenous peoples' original knowledge can become scientific knowledge in ethnoscience studies so that it can be implemented in Biology learning. This is in line with research on integrating ethnoscience in South Kalimantan, which offers potential learning resources (Sholahuddin *et al*., 2022). This research can be recommended as biology learning content which linked to ecosystems and biodiversity are studied in high school biology classes through ethnozoology studies. According to the Indonesian curriculum guidelines, which involve a contextual learning process focusing on and addressing specific issues, this finding can be addressed by integrating an ethnostudy approach into biology content learning (Helida, 2021; Silaban & Sriyati, 2024). Furthermore, these results highlight the relevance of using ethnozoology approaches and locally relevant, contextualized materials in biology learning content teaching to stimulate and promote sustainability awareness (Sholahuddin *et al*., 2022; Saro *et al*., 2023)

CONCLUSION

An ethnological analysis of goldfish farming in the Kasepuhan Citorek Indigenous group produced several findings, including the following: Traditional goldfish spawning methods are still used, with ponds mapped after rice harvest. Then, supply ijuk or coconut leaves to serve as kakaban to attach goldfish eggs. The spawning process lasts 10-12 months, or until the carp weighs one kilogram, after which the fish are relocated to *kerangkeng* along the river flow. Goldfish will be let to grow in cages until they are ready for harvest. Then, farmed goldfish feed in the indigenous community of Kasepuhan Citorek, including pellets, rice snails, and kijing. However, rice snails and kijing account for over 90% of all feed supplied.

The goldfish cultivated by the Kasepuhan Citorek indigenous community are the Sinyonya and Kumpai types. Both of these goldfish commodities have the potential to be developed due to high market demand in trade, hobbies, and collections for consumption. Therefore, the cultivation of goldfish farming carried out by the Kasepuhan Citorek indigenous community can provide great economic benefits. The potential of goldfish farming in Kasepuhan Citorek is expected to grow to expand the current market. Of course, while protecting the environment, applying local wisdom, and following customs for generations, we must utilize the surrounding environment.

In high school biology classes, several biological concepts linked to ecosystems and biodiversity are studied through ethnozoology studies regarding goldfish farming at the Kasepuhan Citorek. These variances include a variety of natural feed, different types of cultured goldfish, and variable biotic conditions through the fish spawning, growth maintenance, and consumer sales process. Considering the wide variety of biological resources in Kasepuhan Citorek, Lebak, Banten Province, this is highly relevant to learning biology.

REFERENCES

Agus, M., & Mardiana, T. Y. (2010). Pengaruh Perbedaan Jenis Pakan Alami Daphnia, Jentik Nyamuk dan Cacing Sutera terhadap Pertumbuhan Ikan Cupang Hias (*Betta splendens*). *Pena Akuatika: Jurnal Ilmiah Perikanan dan Kelautan*, *2*(1).

Akbar, A., Indriani, A. I., Wulandari, R., Gifani, A. G., Salsabila, N., & Astuti, I. A. D. (2021). Pelatihan *Water Purifier* dengan Metode Aerasi dan Filtrasi Menggunakan Saringan Pasir Cepat Sebagai Solusi Penjernihan Air Sumur Di Desa Citorek Timur. *Jurnal Pengabdian Kepada Masyarakat Radisi*, *1*(2), 92–99.

Alimah, S. (2019). Kearifan Lokal dalam Inovasi Pembelajaran Biologi: Strategi Membangun Anak Indonesia yang Literate dan Berkarakter untuk Konservasi Alam. *Jurnal Pendidikan Hayati*, *5*(1).

Andriani, R., Muchdar, F., & Ahmad, K. (2021). Pemanfaatan Bahan Baku Lokal sebagai Pakan Ikan untuk Kelompok Budidaya Ikan di Kota Ternate. *Indonesian Journal of Fisheries Community Empowerment*, *1*(3), 231-239.

Baalu, N., Muhammad Idris, M., Yusnaini, Kurnia, A. (2018). Pertumbuhan Ikan Gabus (*Channa striata*) yang Diberi Pakan Keong Mas (*Pomacea canaliculata*) Segar dan Kering. *Media Akuatika*, *3*(1), 659-658.

Bogdan, R. C. & Biklen, S.R. (1992). *Qualitative Research for Education An Introduction to Theory and Methods Second Edition*. United State of America: Allyn and Bacon.

Carolina, H. S., Liliawati, W., & Sriyati, S. (2024). Kajian Etnosains pada Kuliner Khas Lampung Seruit: Integrasi dengan Konsep Biologi SMA. *Jurnal Biotek*, *12*(1), 1-17.

Fajarwati, M., & Andriani, Y. (2022). Teknik Pembenihan Ikan Mas (*Cyprinus carpio*) di UPTD Balai Benih Ikan (BBI) Cimaja, Kabupaten Sukabumi, Jawa Barat. *Indonesian Journal of Aquaculture Medium*, *2*(2), 86-98.

Fathimah, N. S., Maulidah, I. N., Hamidah, A., & Safitri, W. (2022). Desa Cibinong sebagai Desa Percontohan Budi Daya Ikan Hias di Masa Pandemi Covid-19. *e-Journal Budidaya Perairan*, *10*(2), 220-227.

Gunawan, G., & Khalil, M. (2015). Analisa Proksimat Formulasi Pakan Pelet dengan Penambahan Bahan Baku Hewani yang Berbeda. *Acta Aquatica: Aquatic Sciences Journal*, *2*(1), 23-30.

Handoyo, B., Herlinawati., Soelaksini, L. (2018). Aplikasi Garam (NaCl) untuk Meningkatkan Produksi Padi (*Oryza sativa*) Varietas Situ Bagendit di Tanah Litosol Banyuwangi. *Agritop*, 16(2): 197-204. ISSN: 1693-2877.

Helida, A. (2021). Integrasi Etnobiologi dan Konservasi. *Publikasi Penelitian Terapan dan Kebijakan*, *4*(1), 18-25.

Hermawan, D., Ismalasari, R., Saifullah, Sucipto, A., & Agung, L. A. (2023). Aplikasi Perbedaan Waktu Pemberian Pakan Berhormon Terhadap Sex Reversal pada Ikan Mas Sinyonya (*Cyprinus carpio* L.) G2N F1. *Jurnal Akuakultur Sungai dan Danau, 8*(2), Oktober 2023, pp. 206-212

Istomo & Sari, P. N. (2019). Penyebaran dan Karakteristik Habitat Jenis Rasamala (*Altingia excelsa Noroha)* di Taman Nasional Gunung Halimun Salak. *Journal of Natural Resources and Environmental Management*, *9*(3): 608-625. ISSN: 2460-5824

Kurniaji, A., Ihwan, I., Renitasari, D. P., Saridu, S. A., Usman, Z., & Rahman, S. (2022). Studi Komparasi Hasil Pemijahan Induk Ikan Mas (*Cyprinus carpio*) Menggunakan Metode Alami, Semi Buatan dan Buatan. *Jurnal Intek Akuakultur*, *6*(2), 112-129.

Linhartová, Z., Krejsa, J., Zajíc, T., Másílko, J., Sampels, S., & Mráz, J. (2018). Proximate and Fatty Acid Composition of 13 Important Freshwater Fish Species in Central Europe. *Aquaculture International*, *26*, 695-711.

Makmur, A. (2004). Proses Metabolisme Protein Pakan pada Ikan. *Warta Perikanan Indonesia*, *10*(3), 14-16.

Markisman, Palampanga, A. M., & Lutfi, M. (2019). Pengaruh Faktor Sosial dan Ekonomi terhadap Pendapatan Pembudidaya Ikan Mas di Kecamatan Dolo Selatan. *Jurnal Katalogis*, *4*(3), 58-69.

Muhlisin, M., Ulumi, H. F. B., & Humaeni, A. (2017). Kebijakan Pemerintah Daerah Dalam Perlindungan Masyarakat Adat di Provinsi Banten: Studi Kasus Masyarakat Adat Baduy dan Citorek. *Jurnal Kebijakan Pembangunan Daerah*, *1*(1), 27–44. https://Doi.Org/10.37950/Jkpd.V1i1.4

Mumpuni, F. S., & Farastuti, E. R. (2023). Strategi Pemberian Pakan yang Berbeda terhadap Pertumbuhan dan Kelangsungan Hidup Benih Ikan Mas (*Cyprinus carpio*). *Jurnal Mina Sains*, *9*(1).

Napiorkowska-Krzebietke, A. (2017). Phytoplankton as A Basic Nutritional Source in Diets of Fish. *Journal of Elementology*, *22*(3): 831-841. ISSN 1644-2296

Nugraheni, L. S., Survani, R., & Arindri, D. (2024). The Inventory of Pteridophyta in East Citorek, Lebak, Banten. *Al-Hayat: Journal of Biology and Applied Biology*, *7*(1), 71-80. 10.21580/ah.v7i1.20902

Nuraisyah, A., Raharja, S., & Udin, F. (2018). Krakteristik Kimia Roti Tepung Beras dengan Tambahan Enzim Transglutaminase. *Jurnal Teknologi Industri Pertanian*, *28*(3), 318-330. ISSN: 0216-3160.

Nurfitrirahim. (2013). Laporan Perkembangan Embrio Ikan Mas. *Balai Besar Pengembangan Budidaya Air Tawar*. Sukabumi.

Palinussa, E. M., Sahetapy, J. M., Soplanit, J. C., & Ambon, K. P. Pertumbuhan Ikan Mas dan Kijing Taiwan yang Dipelihara pada Sistem Resirkulasi. *Jurnal Media Akuakultur Indonesia*, *1*(1).

Pranata, A., Fitriyana, F., & Susilo, H. (2022). Tingkat Kesejahteraan Pembudidaya Ikan Dalam Karamba di Desa Penyinggahan Ilir Kecamatan Penyinggahan Kabupaten Kutai Barat Kalimantan Timur. *Jurnal Perikanan Unram*, *12*(3), 418-427.

Putranti, G. P. (2015). Pengaruh Protein dan Energi yang Berbeda pada Pakan Buatan terhadap Efisiensi Pemanfaatan Pakan dan Pertumbuhan Ikan Mas (*Cyprinus carpio*). *Journal of Aquaculture Management and Technology*, *4*(3), 38-45.

Sabrina, S., Ndobe, S., Tisâ, M., & Tobigo, D. T. (2018). Pertumbuhan Benih Ikan Mas (*Cyprinus carpio*) pada Media Biofilter Berbeda. *Jurnal Penyuluhan Perikanan dan Kelautan*, *12*(3), 215-224.

Sihombing, L., & Darus, M. (2021). *Analisis Sistem Agribisnis Ikan Mas di Desa Mariah Jambi (Kasus: Desa Mariah Jambi, Kecamatan Jawamaraja Bah Jambi, Kabupaten Simalungun)* (Doctoral dissertation, Universitas Sumatera Utara).

Saro, J. M., Guzman, M. T., Ochavez, E. E., & Dano, C. O. (2023). Ethno-learning Resources in Teaching Biology for Promoting Sustainability Education: A District-Wide Science Problem. *American Journal of Education and Technology*, *2*(2), 1-9.

Sholahuddin, A., Sya'ban, M. F., Fitriana, R., Shalihah, A., & Misbah, M. (2022). Wetland Ethnoscience Learning Resources: An Overview of Physical Science Concepts. *Berkala Ilmiah Pendidikan Fisika*, *10*(2), 153-62.

Silaban, O. R., & Sriyati, S. (2024). Tinjauan Pedagogi Biologi Berbasis Kearifan Lokal Naniura-Sashimi Batak (Review of Biology Pedagogy Based on Local Wisdom of Naniura-Sashimi Batak). *Biodik*, *10*(2), 22-29.

Singh, P., Sheoran, S., Prasad, A., Tamanna., Nettu., & Rath, L. (2020). Nutrition Composition and Dietary Fiber Analysis of Rice Bran of Selected Varieties of Rice. *International Journal of Current Advanced Research*, *9*(12). (23468-23471). ISSN Online: 2319-6475.

Tarihoran, D. N. (2018). Budidaya Ikan Air Tawar. *Jurnal Budidaya Perairan, Fakultas Ilmu Kelautan dan Perikanan, Universitas Maritim Raja Ali Haji*, 1-12.

Widiati, S., & Rusmana, M. (2020). Peran Sistem Pertanian Lokal dalam Mekanisme Pemenuhan Kebutuhan Pangan (*Food Coping Strategy*) Masyarakat Adat Kasepuhan Cicarucub Berbasis Kearifan Lokal. *Jurnal Agribisnis Terpadu*, *13*(1), 134-153.

Yoviska, S. A., Romadhon, D. W., & Murtini, I. (2021). Perbandingan Secara Morfologi Insang Ikan Mas (*Cyprinus carpio*), Ikan Lele (*Clarias batrachus*) dan Ikan Selar (*Seloroides leprolepis*). *Prosiding Seminar Nasional Penelitian dan Pengabdian Masyarakat*, *6*(1), 125-128.