

UNCOVERING THE HORRIFIC REALITY OF OCTOPUS FARMING

**EUROGROUP
FOR
ANIMALS**

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INTRODUCTION

In 2021, Compassion in World Farming published a report – **Octopus Factory Farming: A Recipe for Disaster** – in which the scientific evidence relating to octopuses and the consequences of farming them was reviewed (1). The report warned of the potential practices in octopus farms that would be detrimental to the welfare of these animals.

For example, octopuses are not suitable for the high stocking densities that are typical of factory farm systems, as they are naturally solitary animals (2,3). The crowded conditions risk increased aggression, and ultimately can lead to cannibalism (2–4).

The report also warned that there is no humane slaughter method for octopuses, and therefore octopus farming should not be allowed due to the suffering it would cause. It has been scientifically demonstrated that octopuses are able to feel pain and possess cognitive attributes comparable to those found in vertebrates (5–8).

Consequently, they should always be slaughtered using a method that avoids any pain, distress, or suffering, and currently there is no method that meets these essential requirements.

Another issue emphasised in the report is the environmental consequences associated with the farming of carnivorous species such as octopuses. Octopuses naturally feed on crabs, clams, small fishes, etc. in the wild (9). In order to feed them in farms, a large amount of live or frozen natural food such as crustaceans and fish is needed (10), which is an unsustainable practice. This dependence on wild-caught fish in their diets, would increase the pressure on our already overexploited fish stocks (11–13).

Despite all the concerning issues, Nueva Pescanova, a Spanish multinational seafood company, has submitted a plan to build the world's first commercial octopus farm in the Port of Las Palmas, in Spain's Canary Islands (14). At the time of writing this report, the required national permit processes are still pending and are dependent upon the final approval and publication of the Environmental Impact Assessment (EIA) report.

Eurogroup for Animals has received information from sources in Spain regarding Nueva Pescanova's planned operations for this future farm.

In summary, the farm plans include construction of a two-storey building with:

40-60 FATTENING TANKS

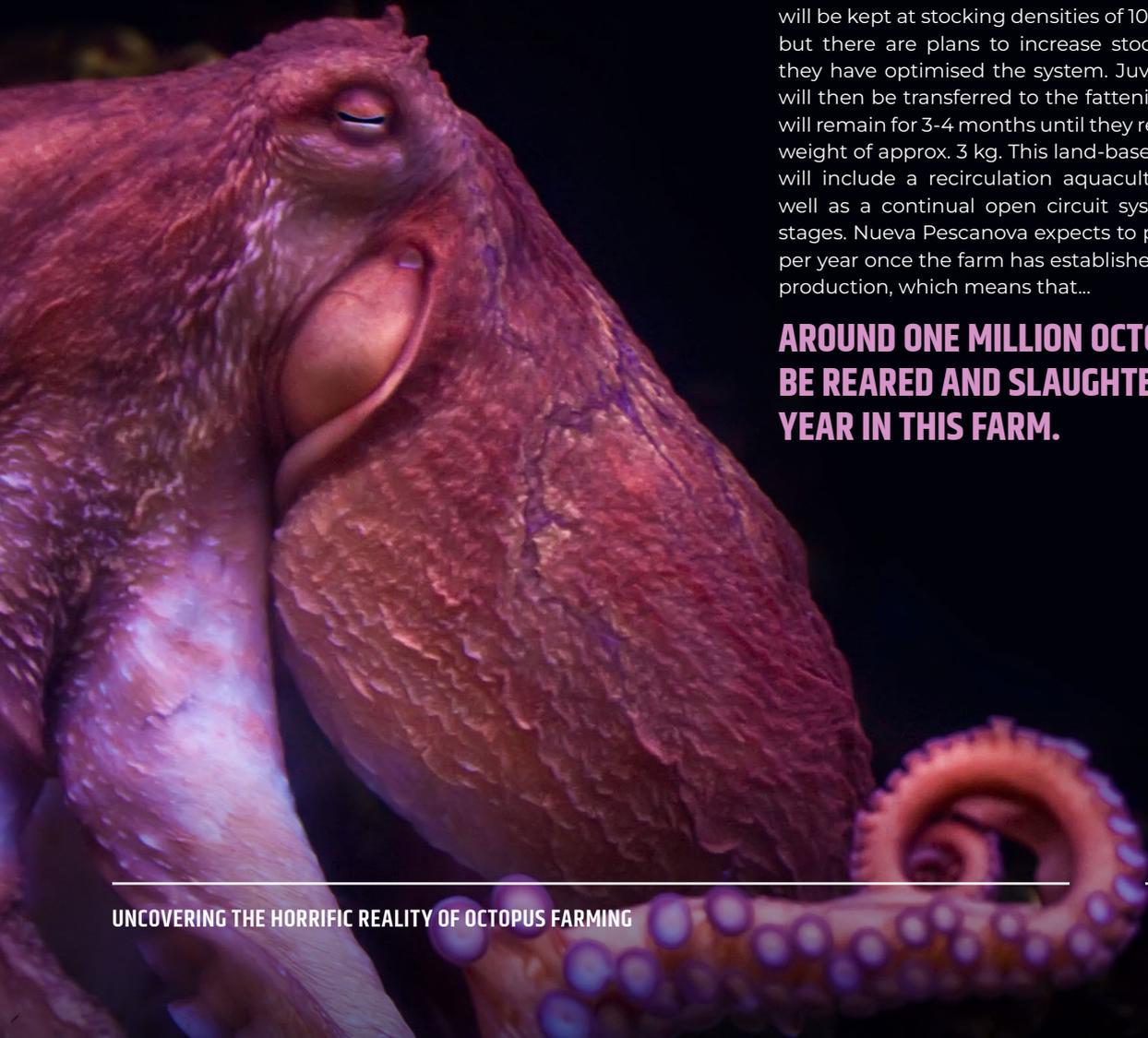
550-650 SETTLEMENT TANKS

90-110 TANKS FOR PARALARVAE

22-36 TANKS FOR BROODSTOCK OCTOPUSES

First steps in establishing production on the farm include the use of 100 individuals for reproductive aims; they will use 30 females and 70 males hosted in 20 tanks of 15m³. The transport of some individuals from Nueva Pescanova's research facilities in the North of Spain (15) is also contemplated as a supportive measure. Once eggs are obtained, males will be removed from the tanks. Paralarvae will be kept at stocking densities of 10 kg/m³ for 80-90 days, but there are plans to increase stocking densities when they have optimised the system. Juveniles of around 1 kg will then be transferred to the fattening tanks, where they will remain for 3-4 months until they reach the slaughtering weight of approx. 3 kg. This land-based aquaculture facility will include a recirculation aquaculture system (RAS) as well as a continual open circuit system for different life stages. Nueva Pescanova expects to produce 3,000 tonnes per year once the farm has established its 100% capacity of production, which means that...

AROUND ONE MILLION OCTOPUSES WILL BE REARED AND SLAUGHTERED EACH YEAR IN THIS FARM.



CONCERNS

The following list highlights our main concerns about the planned practices, explains why they represent a welfare or environmental risk and provides scientific evidence proving the potential harmful consequences of each one:

1

OCTOPUSES WILL BE KILLED USING ICE SLURRY WITHOUT PRE-STUNNING - AN INHUMANE METHOD THAT CAUSES PAIN, FEAR AND SUFFERING

Nueva Pescanova plans to kill octopuses by submerging them in tanks containing 500 litres of water with ice at $-3/0^{\circ}\text{C}$, which will result in a painful, stressful, and slow death. The use of ice slurry to kill other aquatic animals, such as fish, without pre-stunning has been scientifically shown to be inhumane (16), causing considerable pain, fear, suffering and an extremely prolonged death (17). Given the welfare issues associated with the use of ice slurry, the European Food Safety Authority (EFSA) discourages its use for several fish species (18–21), and the EU is currently drafting legislation to end the practice in major aquaculture sectors (22). It is unacceptable that ice slurry has been selected to slaughter octopuses, despite the demonstrated problems with the use of this method, and the current efforts to eliminate its use in fish species on welfare grounds.

2

OCTOPUSES, SOLITARY IN NATURE, WILL BE KEPT IN OVERCROWDED CONDITIONS WHERE THEY WILL BE AT RISK FROM AGGRESSION AND CANNIBALISM

Octopuses are mostly solitary-living animals (2–4,23), which is acknowledged in Nueva Pescanova's operational plans. However, octopuses will be kept in groups, at high stocking densities, within their farms. Nueva Pescanova plans to keep octopuses at 10-30 kg/m^3 , which equates to 10 to 15 octopuses per cubic metre. Housing species who are solitary by nature in high densities can result in poor welfare (3), and creates the risk of aggression and territorialism leading to cannibalism (2,4). Nueva Pescanova is aware of the issue and, in order to control this problem, the farm plans include separating individuals by sex and size.

3

PLANS TO EXPOSE OCTOPUSES TO 24-HOUR PERIODS OF CONSTANT UNNATURAL LIGHT ARE LIKELY TO CAUSE SIGNIFICANT STRESS TO THE ANIMALS, WHO NATURALLY AVOID LIGHT

Nueva Pescanova plans to use 24-hour periods of light during the reproduction period to speed up the spawning of the females. However, octopuses spend much of their time in dark sheltered areas in the wild. Octopuses are able to "feel" light in their arms (24). It has been observed that octopuses fold their arms during daytime, whereas at night they are extended (24). This behaviour corresponds to an instinctive manner to protect themselves from potential daytime predators (24). Therefore, their natural behaviour is to avoid the light, and the photoperiods of 24 hours of continued light could be very stressful for these animals. Nueva Pescanova's operational plans recognise that octopuses naturally avoid the light, stating "juveniles and adult octopuses have negative phototaxis, showing movements to move away from places with light", yet their plans still include 24-hour periods of light exposure.



4

OCTOPUSES WILL BE FED WITH COMMERCIAL FEEDS CONTAINING FISHMEAL AND FISH OIL AS MAIN INGREDIENTS, POSING HIGH ENVIRONMENTAL RISKS

Commercial feeds for carnivorous aquatic species include fishmeal and fish oil as main ingredients, which are viewed as highly unsustainable (10). Fishmeal and fish oil are mainly produced from forage fish such as anchovy, sardines, herring, and mackerel (12). Forage fish play a key role in the marine environment as they are crucial in transferring energy from primary producers to higher trophic-level species including large fish, marine mammals, and seabirds (12). Therefore, the use of these species to feed aquatic carnivorous species poses high environmental risks (11,12,25–27). Moreover, the “Strategic Guidelines for the sustainable development of aquaculture” adopted by the EU Commission in May 2021 (28) aim to reduce aquaculture’s reliance on fishmeal and fish oil produced from wild-caught fish, including by aquaculture transitioning to produce low-trophic species. Establishing a new industry farming a carnivorous species, which will heavily rely on these ingredients, appears to be at odds with the intentions set out by the Commission.

Compassion in World Farming recently published a report - Rethinking EU Aquaculture: for people, animals and the planet – explaining this issue and presenting alternatives to carnivorous aquaculture, since a change towards more sustainable aquatic farming is crucial (29).

5

THE ENVIRONMENTAL IMPACTS ASSOCIATED WITH WASTE FROM THE FARM HAVE NOT BEEN PROPERLY EVALUATED

The farm application gives no evidence that comprehensive evaluations or estimations have been carried out to calculate the amount of waste that the farm will produce. The document only shows that controls will be performed according to the current legislation, however an estimation of feed and faeces waste based on the production capacity are not included, therefore the magnitude of the environmental impact in the surrounding area of the farm is unknown.

6

AN ASSESSMENT OF POTENTIAL DISEASES IN FARMING CONDITIONS HAS NOT BEEN PROPERLY CARRIED OUT

Potential octopus diseases and chemical treatments that would need to be applied in the farm are not described or estimated. Therefore, the health of these animals is not properly assessed, nor are the medicines that will be needed. The document only states that a follow-up on the diseases will be done, and the sources will be tracked. Given that overcrowded conditions in farms commonly lead to major incidences of microbial diseases, the potential bacterial and viral diseases should be assessed and evaluated before the farm is established. It is also crucial that the chemicals and antibiotics that may be used are also evaluated given their impact on the environment and on global health (30,31).

7

THERE ARE ETHICAL AND ENVIRONMENTAL ISSUES ASSOCIATED WITH THE PROPOSED LAND-BASED AQUACULTURE SYSTEM

There is an extremely high amount of energy and water usage associated with land-based recirculation aquaculture systems (RAS) (32–34), and similar energy demands when pumping for a continual flow-through. This, of course, causes concerns in terms of the unsustainable amount of greenhouse gas emissions that may be generated from this farm and poses energy and water security problems. Moreover, there are several animal welfare risks linked to land-based RAS as well. For example, there is a higher risk of mass mortality among the octopuses living in this system relating to increased chances of disease spread, poor water quality, and system failure (32,35). These risks are compounded by the inherent need for high stocking densities within RAS systems in order for them to be profitable (32). As mentioned above, crowded conditions are especially inappropriate for solitary octopuses. Furthermore, these aquaculture environments are entirely artificial. This contradicts the welfare needs of highly intelligent animals such as octopuses who require varied stimuli within their habitats.

CONCLUSIONS

Compassion in World Farming and Eurogroup for Animals believe that the plans and practices presented in this document are extremely concerning on both animal welfare and environmental grounds and that permission to build the farm should be rejected.

- These animals are unsuitable for farming conditions given their solitary nature, and the high densities proposed may lead to serious welfare problems.
- It is particularly worrying that octopuses will be slaughtered using ice slurry, an inhumane killing method that the aquaculture industry (mainly fish farms) is working to eliminate from current practices. The adoption of this method would force octopuses to suffer very painful, stressful, and long deaths.
- The suggestion of 24-hour photoperiods during the reproduction phase is also very concerning given the aversion these animals have to light.
- In summary, the welfare of octopuses has not been properly considered in the current plans of the farm.

In addition, it is important that any new aquaculture species are sustainable and resource-efficient. Octopus farming goes against this premise since the feed contains human-edible ingredients such as fish or soybean, contributing to overfishing of wild fish populations and with linkages to deforestation. Octopus farming is fundamentally unsustainable. The EU should not provide funding support to industrial octopus farming developments, or any other new animal-based farming methods that clearly defy a sustainable food system transformation.

REFERENCES

1. Compassion in World Farming. Octopus Factory Farming: A Recipe for Disaster. 2021.
2. Mather JA, Scheel D. Behaviour. In: Iglesias J, Fuentes L, Villanueva R, editors. Cephalopod Culture [Internet]. Dordrecht: Springer Netherlands; 2014 [cited 2020 Oct 7]. p. 17–39. Available from: <http://link.springer.com/10.1007/978-94-017-8648-5>
3. Cooke GM, Tonkins BM, Mather JA. Care and Enrichment for Captive Cephalopods. In 2019 [cited 2020 Dec 3]. p. 179–208. Available from: http://link.springer.com/10.1007/978-3-030-13947-6_8
4. Jacquet J, Franks B, Godfrey-Smith P, Sánchez-Suárez W. The Case Against Octopus Farming. *Issues Sci Technol*. 2019;37–44.
5. Crook RJ. Behavioral and neurophysiological evidence suggests affective pain experience in octopus. *iScience* [Internet]. 2021 Mar 19 [cited 2021 Apr 12];24(3). Available from: <https://doi.org/10.1016/j.isci>
6. Andrews PLR, Darmaillacq AS, Dennison N, Gleadall IG, Hawkins P, Messenger JB, et al. The identification and management of pain, suffering and distress in cephalopods, including anaesthesia, analgesia and humane killing. *J Exp Mar Bio Ecol*. 2013 Sep 1;447:46–464.
7. Darmaillacq AS, Dickel L, Mather J. Cephalopod cognition [Internet]. *Cephalopod Cognition*. Cambridge, United Kingdom: Cambridge University Press; 2014 [cited 2020 Dec 2]. 1–263 p. Available from: <https://www.cambridge.org/core/books/cephalopod-cognition/A3C9A184BDC52A7D8ACA4A8728F0BE3A>
8. Schnell AK, Amodio P, Boeckle M, Clayton NS. How intelligent is a cephalopod? Lessons from comparative cognition. *Biol Rev*. 2020;(September).
9. Guerraa Á, Allcock L, Pereirac J. Cephalopod life history, ecology and fisheries: An introduction. *Fish Res* [Internet]. 2010;106(2):117–24. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0165783610002110?via%3Dihub>
10. Villanueva R, Sykes A V., Vidal EAG, Rosas C, Nabhitabhata J, Fuentes L, et al. Current status and future challenges in cephalopod culture. In: *Cephalopod Culture*. Springer Netherlands; 2014. p. 479–89.
11. Cashion T, Le Manach F, Zeller D, Pauly D. Most fish destined for fishmeal production are food-grade fish. *Fish Fish*. 2017;18(5):837–44.
12. Alder J, Campbell B, Karpouzi V, Kaschner K, Pauly D. Forage Fish: From Ecosystems to Markets Further ANNUAL REVIEWS. 2008 [cited 2019 Feb 15]; Available from: <http://www.fishbase.org>
13. The State of World Fisheries and Aquaculture 2020. *State World Fish Aquac 2020*. 2020 Jun 8.
14. Nueva Pescanova's proposal for world's first octopus farm criticized by environmental groups | SeafoodSource [Internet]. [cited 2023 Feb 22]. Available from: <https://www.seafoodsource.com/news/aquaculture/aa-alliance-expresses-concern-about-nueva-pescanova-s-proposal-for-the-world-s-first-commercial-octopus-farm>
15. Pescanova Biomarine Center será el primer centro de acuicultura privada y el referente del cultivo del pulpo - Europa Azul [Internet]. [cited 2023 Mar 2]. Available from: <https://europa-azul.es/pescanova-biomarine-center>
16. Lines JA, Spence J. Humane harvesting and slaughter of farmed fish. *Rev sci tech Off int Epiz*. 2014.
17. Poli BM, Parisi G, Scappini F, Zampacavallo G. Fish welfare and quality as affected by pre-slaughter and slaughter management. *Aquac Int*. 2005 Jan;13(1–2):29–49.
18. Species-specific welfare aspects of the main systems of stunning and killing of farmed Atlantic Salmon. *EFSA J* [Internet]. 2009 Apr 1 [cited 2023 Feb 16];7(4). Available from: <https://www.efsa.europa.eu/en/efsajournal/pub/1011>
19. Species-specific welfare aspects of the main systems of stunning and killing of farmed Eels (*Anguilla Anguilla*). *EFSA J* [Internet]. 2009 Apr 1 [cited 2023 Feb 16];7(4). Available from: <https://www.efsa.europa.eu/en/efsajournal/pub/1014>
20. Species-specific welfare aspects of the main systems of stunning and killing of farmed Seabass and Seabream. *EFSA J* [Internet]. 2009 Apr 1 [cited 2023 Feb 16];7(4). Available from: <https://www.efsa.europa.eu/en/efsajournal/pub/1010>
21. Species-specific welfare aspects of the main systems of stunning and killing of farmed turbot. *EFSA J* [Internet]. 2009 May 1 [cited 2023 Feb 16];7(5). Available from: <https://www.efsa.europa.eu/en/efsajournal/pub/1073>
22. Animal welfare – revision of EU legislation [Internet]. [cited 2023 Mar 2]. Available from: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12950-Animal-welfare-revision-of-EU-legislation_en

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23. Godfrey-Smith P. "Octopus experience" [Internet]. 2019 [cited 2020 Mar 16]. Available from: <https://animalstudiesrepository.org/animsent/vol4/iss26/18>
 24. Katz I, Shomrat T, Neshet N. Feel the light: sight-independent negative phototactic response in octopus arms. *J Exp Biol* [Internet]. 2021 Mar 1 [cited 2023 Feb 16];224(5). Available from: <https://journals.biologists.com/jeb/article/224/5/jeb237529/237521/Feel-the-light-sight-independent-negative>
 25. Naylor RL, Goldburg RJ, Primavera JH, Kautsky N, Beveridge MCM, Clay J, et al. Effect of aquaculture on world fish supplies. *Nature* [Internet]. 2000 Jun 29 [cited 2018 Oct 8];405(6790):1017–24. Available from: <http://www.nature.com/articles/35016500>
 26. Naylor RL, Hardy RW, Bureau DP, Chiu A, Elliott M, Farrell AP, et al. Feeding aquaculture in an era of finite resources. *Proc Natl Acad Sci U S A* [Internet]. 2009 Sep 8 [cited 2018 Oct 8];106(36):15103–10. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19805247>
 27. Naylor RL, Hardy RW, Buschmann AH, Bush SR, Cao L, Klinger DH, et al. A 20-year retrospective review of global aquaculture. *Nat* 2021 5917851 [Internet]. 2021 Mar 24 [cited 2022 Jun 2];591(7851):551–63. Available from: <https://www.nature.com/articles/s41586-021-03308-6>
 28. Aquaculture guidelines [Internet]. [cited 2023 Mar 2]. Available from: https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/aquaculture/aquaculture-guidelines_en
 29. Rethinking EU Aquaculture: for people, animals and the planet | Compassion in World Farming International [Internet]. [cited 2023 Mar 2]. Available from: <https://www.ciwf.org/resources/reports-position-papers-briefings/rethinking-eu-aquaculture-for-people-animals-and-the-planet/>
 30. Cabello FC. Heavy use of prophylactic antibiotics in aquaculture: a growing problem for human and animal health and for the environment. *Environ Microbiol* [Internet]. 2006 Jul 1 [cited 2019 Apr 24];8(7):1137–44. Available from: <http://doi.wiley.com/10.1111/j.1462-2920.2006.01054.x>
 31. World Organisation for Animal Health (OIE). Protecting aquatic animals, preserving our future [Internet]. 2019 [cited 2022 Jul 19]. Available from: <https://www.woah.org/app/uploads/2021/03/en-brochure20aquatic20animals-final-1d.pdf>
 32. Badiola M, Basurko OC, Piedrahita R, Hundley P, Mendiola D. Energy use in Recirculating Aquaculture Systems (RAS): A review. Vol. 81, *Aquacultural Engineering*. Elsevier; 2018. p. 57–70.
 33. Winther U, Ziegler F, Hognes ES, Emanuelsson A, Sund V, Ellingsen H. Carbon footprint and energy use of Norwegian seafood products. SINTEF Fisheries and Aquaculture report [Internet]. Processing. 2009 [cited 2023 Feb 27]. Available from: www.sintef.no
 34. Review of Recirculation Aquaculture System Technologies and their Commercial Application. Prepared for Highlands and Islands Enterprise. Stirling Aquaculture [Internet]. 2014 [cited 2023 Feb 27]. Available from: <http://dspace.stir.ac.uk/handle/1893/21109>
 35. Xue S, Xu W, Wei J, Sun J. Impact of environmental bacterial communities on fish health in marine recirculating aquaculture systems. *Vet Microbiol*. 2017 May 1;203:34–9.

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