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Self-declaration as a country free of Infection with Infectious Myonecrosis Virus by Peru

Self-Declaration sent to the OIE on 12 February 2020 by Dr Eva Luz Martínez Bermúdez, Delegate of Peru to the OIE, Director General of Animal Health SENASA, Ministry of Agriculture and Irrigation.

1. General presentation and scope of application

The National Fisheries Sanitary Agency (SANIPES), national health authority in terms of hydrobiological resources in Peru is a specialized technical agency under the Ministry of Production (PRODUCE), responsible of regulating, supervising and inspecting the sanitary and safety activities with regard to fishing, aquaculture and feed of hydrobiological origin within its competency in accordance with the provisions of articles 2 and 3 of Law 30063 Law on the creation of the National Fisheries Sanitary Agency (SANIPES).¹

SANIPES, as competent health authority, requests to the World Organisation for Animal Health (OIE) the publication of the country's self-declaration of freedom from the disease caused by the Infectious Myonecrosis Virus (IMNV), as of 31 January 2020, and in accordance with Article 9.5.4 (Chapter 9.5) of the Aquatic Animal Health Code (Aquatic Code, 2019).

2. Biosecurity measures implemented to protect aquaculture resources in Peru

Through SANIPES, Peru has established biosafety and control measures to protect aquaculture resources, such as the requirement of import sanitary certificates, quarantine, movement control at border posts, along with contingency plans, among others, the purpose of which is to protect and maintain the sanitary status of the country. This is due to the fact that Article 12 of the Regulation of the General Law of Aquaculture, approved by Supreme Decree 003-2016-PRODUCE² (hereinafter the "Regulation"), stipulates that the surveillance and sanitary control of all aquaculture cultivation centres falls under the authority of SANIPES.

¹ http://www.sanipes.gob.pe/normativas/10_30063.pdf

² <https://busquedas.elperuano.pe/download/url/decreto-supremo-que-modifica-el-reglamento-de-la-ley-general-decreto-supremo-n-002-2020-produce-1847049-2>

2.1. Sanitary control for aquaculture resources

In accordance with the provisions of section 12.2 of article 12 of the Regulation, the holder of a concession or authorisation is obliged to inform SANIPES about any epizootic event or outbreak of an infectious disease, and which may occur in the cultivation area as well as in thereareas in the near. Additionally, Contingency Plans against disease outbreaks are a mandatory requirement for aquaculture production centres, which must be approved by SANIPES in order to obtain sanitary authorisation (Article 29 of the Regulation).

Response to outbreaks is carried out and controlled by SANIPES, which has implemented an Early Warning Rapid Response System (Annex 1), so as to undertake timely responses to the appearance of any outbreak of a disease or epizootic event. Likewise, in order to have a greater outreach, SANIPES works in coordination with its Decentralized Offices, which are distributed throughout the country (14 in total, Annex 2).

With respect to any possible spread of a pathogen, SANIPES has established sanitary control measures that include the implementation of Emergency³ and Contingency⁴ Plans. The aforementioned establish control and prevention measures to reduce losses attributed to epizootic events and prevent the spread of pathogens that affect fish and crustaceans, such as the exclusive use of disease-free aquaculture seeds, disinfection of infrastructure and fomites, restriction of visits to (farming) centres, water treatment and adequate disposal of dead animals.

2.1.1. Sanitary control of aquaculture seeds and broodstock

Due to the high risk of the entry and/or dissemination of diseases through the movement of aquaculture seeds (eggs, fry or post-larvae) and broodstock, Article 50 of the Regulation establishes that SANIPES and the competent agency of the Regional Government must be informed of all movements of hydrobiological resources for aquaculture purposes, providing information regarding the origin, final destination, species, number of specimens, and average size and weight. Movements of hydrobiological resources that are restricted due to sanitary risks cannot be carried out for aquaculture purposes.

In the case of post-larvae whiteleg shrimps, marketing, transportation and use for aquaculture purposes are only allowed when specimens come from national or foreign artificial production centres or laboratories. In Peru, since 2004, the extraction of wild post-larvae as a seed for aquaculture has been prohibited, due to the high risk of spreading diseases, mainly due to the White Spot Virus⁵. To ensure compliance with this regulation, SANIPES participates, together with other institutions, in controls activities with relevant power to seize post wild larvae.

In the case of imported post-larvae, a sanitary certificate must be provided to ensure that they are free of IMNV infection and other diseases that affect penaeid shrimps. Currently, only post larvae of white shrimp are imported from Ecuador and Colombia, Countries with which health certificates declaring that the organisms are free of IMNV have been harmonised. Likewise, when importing post-larvae, SANIPES takes samples of products to rule out diseases according to what is stated in the health certificate. In the case of post larvae produced in Peru, there is currently only one laboratory that produces seeds for its own supply, which is also continuously monitored by SANIPES through the Plan of the Surveillance System of Hydrobiological Resources.

³ <https://www.sanipes.gob.pe/tilapia/Plan-Emergencia-TiLV.pdf>

⁴ <http://www.comunidadandina.org/StaticFiles/DocOf/RESO1851.pdf>

⁵ <http://extwprlegs1.fao.org/docs/pdf/per165084.pdf>

Smuggled post-larvae pose a risk of disease transmission for farmed and wild shrimp, so during the operation, the health authority proceeds with their disposal. During the period December 2017 to September 2019, SANIPES through the Tumbes Deconcentrated Offices DO recorded a total of 15 operations. (Annex 3)

2.1.2. Sanitary inspections in aquaculture production centres

Within its competency, SANIPES undertakes sanitary inspections of aquaculture production centres in accordance with the provisions set down by article 10 of Law 30063, i.e. the Law on the Creation of the National Fisheries Sanitary Agency (SANIPES), along with article 25 of the Regulations of the aforementioned Law. In Peru, the 65 authorised whiteleg shrimp farming centres are visited at least three (3) times a year, in order to verify compliance with the provisions of the Manual of Good Aquaculture Practices and the Manual of Hygiene and Sanitation of the producer. (See [annexe 4 on Biosecurity](#), [Annexe 5 on Good Aquaculture Practices](#) and [Annexe 6 on hygiene and sanitation](#)).

In general, shrimp farming centres comply with basic preventive controls, such as: perimeter fence to avoid the entrance of people and wild animals, control posts where they carry out disinfection of people and vehicles cleaning, disinfection and preparation of soils (in earthen ponds); Monitoring of mortality, food consumption, growth. Monitoring of mortality, food consumption, growth is performed. Some of the farms have wells for effluents treatment (intensive farming and hatchery centers), laboratories for analysis in-situ and microbiology, tanks for acclimatization of post-larvae, raceways (where they carry out discard of diseases) and special ponds to allocate dead animals.

Furthermore, SANIPES also carries out sanitary inspections of cultivation centres following the notification of mortalities associated with outbreaks of infectious diseases, in order to gather information; for this purpose it uses a questionnaire known as the “Epidemiological Information Survey,”⁶ while also taking samples to determine and/or confirm the infectious agent that is possibly causing the outbreak. As mentioned in point 2.1, in the event of a mass mortality event, producers of white shrimp must report to SANIPES in order to determine the causal agent and apply the measures to control and eradicate the pathogen. In the last 3 years, mortalities attributed to Acute hepatopancreatic necrosis disease (AHPND), Infection with white spot syndrome (WSSV) and Infection with Taura syndrome virus (Table 8) have been reported, and mortalities attributed to IMNV have never been reported. According to studies in wild shrimps, no evidence of infection from IMNV was found.

Sanitary inspections are recorded in a sanitary act⁷ in which the recommendations and/or suggestions are also set down and must be implemented by the producer to improve biosecurity measures along with preventive controls.

2.1.3. Disease diagnoses capacity

SANIPES has an Aquatic Health Laboratory which undertakes analysis of endemic diseases that affect whiteleg shrimp. It also has a network of public and private laboratories dedicated to the diagnosis of IMNV, as well as other diseases that affect whiteleg shrimp resources (Annex 4).

In order to maintain internal quality standards, both public and private laboratories take part in international tests, such as the twice-yearly Ring Test conducted by the Aquaculture Pathology Laboratory of the University of Arizona (USA), for methods of diagnosis of compulsory notification diseases affecting whiteleg shrimp, including that used to detect IMNV, obtaining satisfactory results.

⁶ Annex 1 of : <https://www.sanipes.gob.pe/tilapia/Plan-Emergencia-TiLV.pdf>

⁷ http://www.sanipes.gob.pe/archivos/transparencia/PLAN_14303_2015_D.S._N_009-2014-PRODUCE_QUE_APRUEBA_EL_REGLAMENTO_DE_ORGANIZACION_Y_FUNCIONES_-_ROF.pdf

2.1.4. Sanitary control research

The Regulation for Organisation and Tasks of SANIPES, which was passed by Supreme Decree 009-2014-PRODUCE⁸ establishes that the agency is responsible for undertaking research in the area of aquaculture health in order to prevent the entry of pathogens, diseases, substances or any other elements that may affect the health and life of the country's hydrobiological resources.

With regard to the above, SANIPES has implemented research projects related to disease control and prevention, the results of which have been disseminated in scientific publications (Annex 8). Furthermore, through the implementation of these projects, skills in disease diagnosis techniques and measures to control and prevent the spread of diseases were strengthened, through courses aimed at the technical personnel of SANIPES, as well as public and private institutions and aquaculture producers.

2.1.5. Quarantine and control of movements

SANIPES has three border control posts located in the departments of Tumbes, Puno and Madre de Dios (Annex 2 and Table 1), in which quarantine and control activities of imported hydrobiological resources are undertaken. These activities are included in Procedure P01-SDCPA-SANIPES: Official sanitary certification for the commercialisation of food and feed of fishery and aquaculture origin and hydrobiological resources⁹ of the Sub-directorate of Fisheries and Aquaculture Certifications of the Directorate of Fisheries Certifications and Aquaculture of SANIPES.

Table 1. List of border control posts, Perú, 2020.

Border Control Posts	Location
Bi-national Border Services Centres (CEBAF) Tumbes	Aguas verdes, Tumbes
Bi-national Border Services Centres (CEBAF) Puno	Desaguadero, Puno
Iñapari border post	Iñapari, Madre de Dios

For imports of whiteleg shrimp specimens for aquaculture purposes, it is mandatory that the sanitary certificate ensures that the animals are free from IMNV and other notifiable diseases that affect penaeid shrimps. To date, only of white shrimp (post-larvae stage) have been allowed to be imported from Ecuador and Colombia, countries that are also free from IMNV, as reported in the OIE WAHIS. However, SANIPES, in compliance with the provisions of Chapter 9.5 of the Aquatic Code, complementary to the Health Certificate statements, proceeds to random sampling of the imported goods to rule out the seven pathogens of obligatory notification. In addition, since 2019, SANIPES has been carrying out a research project aimed at strengthening the risk analysis of imports of post larvae of white shrimp from Ecuador and Colombia. So far, only the importation of white shrimp specimens (in post larva stage), from Ecuador and Colombia, has been authorized. For further details on the biosecurity associated with the movement of white shrimp please see Annex 9.

⁸ http://www.sanipes.gob.pe/archivos/transparencia/PLAN_14303_2015_D.S._N_009-2014-PRODUCE_QUE_APRUEBA_EL_REGLAMENTO_DE_ORGANIZACION_Y_FUNCIONES_-_ROF.pdf

⁹ https://www.sanipes.gob.pe/documentos_sanipes/procedimiento/2018/f78c2d0e1bf08bb1f46712fd0257906f.pdf

3. Evidence supporting the absence of IMNV

As a member country of the World Organisation for Animal Health (OIE), Peru follows the recommendations established in the *Aquatic Code* for the surveillance of diseases that affect aquaculture resources, including the disease caused by IMNV. Consequently, SANIPES has implemented a disease surveillance system¹⁰ coordinated and implemented each year by the Sub-Directorate of Aquaculture Health with the support of its decentralised offices (DO).

3.1 Susceptible species

According to the *Aquatic Code* (2019), the species susceptible to the Infectious Myonecrosis Virus (IMNV) are the brown tiger prawn (*P. esculentus*), banana shrimp (*P. merguensis*), and whiteleg shrimp (*L. vannamei*). In Peru, the whiteleg shrimp (*Litopenaeus vannamei*) is naturally present. However, in recent years it has stood out as the country's second most important aquaculture species. The cultivation of this species mainly takes place in north-western Peru in the departments of Tumbes and Piura, where 65 authorised cultivation centres are distributed, and which in 2018 harvested a total of 32,292 MT (Table 2).

Table 2. Annual harvest of *Litopenaeus vannamei* shrimp from aquaculture, Perú, 2009 - 2019.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Harvested shrimp (MT)	13.425	13.598	16.379	17.801	17.883	21.484	22.183	20.441	27.492	32.292	26,943
Number of farms	43	43	48	50	51	58	59	57	60	64	61

Source: National Network of Aquaculture Information (RNIA), 2018; PRODUCE, 2019.

3.2. Activities and results of IMNV surveillance

Sanitary surveillance for the Infectious Myonecrosis Virus (IMNV) in penaeid shrimps (wild and farmed) has been carried out by the Tumbes Coastal Laboratory of the Institute of the Sea of Peru (IMARPE) during the years 2009 to 2013 and for 2016; and by SANIPES during the years 2012 to 2019. It should be noted that all samples analyzed by both institutions have provided negative results for this pathogen.

a. Sanitary Surveillance carried out by the Institute of the Sea of Peru (IMARPE)

The Tumbes Coastal Laboratory of IMARPE, is a state laboratory that provides services in order to rule out the presence of diseases that affect penaeid shrimps, and both for the public and private sectors. Consequently, IMARPE has ruled out the presence of IMNV during the years 2009 to 2013 and for 2016 (Table 3).

Table 3. Number of samples analysed by IMARPE to rule out the presence of IMNV, Perú 2009 to 2013, 2016.

Year	2009	2010	2011	2012	2013	2016
Farmed shrimp	-	-	-	-	357	50
Wild shrimp	1926	2809	1589	1956	-	-
Total	1926	2809	1589	1956	357	50

Source: IMARPE (2020)

¹⁰ https://www.sanipes.gob.pe/documentos_sanipes/rde/2019/41cc11a56eb5680fbcc1fe9feb84c38e.pdf

b. Sanitary Surveillance carried out by the National Fisheries Sanitary Agency (SANIPES)

Furthermore and since 2012, SANIPES has established an active annual surveillance system, by means of which it rules out the presence of the Infectious Myonecrosis Virus (IMNV) in farmed and wild whiteleg shrimp.

It should be noted that since 2017, SANIPES has been implementing the Work Plan of the Hydrobiological Resources Disease Surveillance System (PTSVERH),¹¹ which includes the monitoring of the 65 whiteleg shrimp farming centres, which are visited two times a year in order to carry out sampling to detect the presence of compulsory notification diseases that can affect whiteleg shrimp. The Plan also contemplates the sanitary monitoring of wild whiteleg shrimp coming from tidal channels and beaches in the department of Tumbes. Given that in Peru the IMNV infection has never been suspected or detected, a prevalence design has been adopted of between 0.5 - 2% (depending on the epidemiological unit), with a sensitivity of 95%, a specificity of 100% and a 95% confidence level in order to calculate the number of samples (Table 4).

Table 4. Inputs to determine the number of samples (pools) for each epidemiological unit, Perú 2020

Epidemiological unit	Sample size	Sensibility	Confidence level	Designated Prevalence	No. of samples each six months	No. of samples each year
Tumbes (North, Centre, South 1 and South 2)	10	0.95	0.95	0.003	106	212
Piura	10	0.95	0.95	0.02	16	32
Hatchery (Punta mero)	50	0.95	0.95	0.02	16	32
Tidal channels	10	0.95	0.95	0.02	16	32
TOTAL					154	308

* Details of the geographical location of the epidemiological units and geo-referencing of the cultivation centres are included in the Plan.

Samples are analysed according to Article 4.3.1.2.3.2. of Chapter 2.2.5 (Infection with Infectious Myonecrosis Virus) of the Aquatic Manual, using RT-PCR, (method referenced by Poulos & Lightner, 2006), using pleopods as target tissue. For the selection of the specimens used for laboratory tests, a systematic directed sampling according to a single stage is carried out, that is to say, it is not probabilistic and in which specimens are collected from a cultivation tank deemed problematic (with a high mortality rate, clinical signs of disease or low growth), specifically in the exit gate of the tank or in the feeding trays. Moreover, in the case of sampling whiteleg shrimp from tidal channels, a simple random sampling is used, so that each organism of the target population has the same probability of being selected.

The number of samples is presented in Table 5. Within the framework of the SANIPES surveillance plan, 25-289 whiteleg shrimp were collected from 20-65 cultivation centres (from a total of 65), carried out between 2012 and 2019. A total of 1007 samples were obtained (in pools of 10 shrimps), which were then submitted to tests in order to discard IMNV. In the case of wild whiteleg shrimp from tidal channels, 14 - 84 samples were taken, with a total of 130 specimens (in pools of 10).

¹¹ https://www.sanipes.gob.pe/documentos_sanipes/rde/2019/41cc11a56eb5680fbcc1fe9feb84c38e.pdf

Table 5. Number of samples taken by SANIPES for surveillance of IMNV in cultivation centres and tidal channels, Perú, 2012 – 2019.

Year	2012	2013	2014	2015	2016	2017	2018	2019
Farmed whiteleg Shrimp	25	36	56	120	80	120	281	289
Whiteleg Wild Shrimp	-	-	-	-	-	84	32	14
Total	25	36	56	120	80	204	313	303

Source: SANIPES (2020)

Consequently, and through the active sanitary surveillance carried out by IMARPE and SANIPES (from 2009 to 2019), a total of 9,824 tests were undertaken to discard IMNV in whiteleg shrimp samples from cultivation centres and tidal channels, all providing negative results. Thus, these results indicate that the country is free of the disease caused by the Infectious Myonecrosis Virus (IMNV).

Table 6. Number of samples taken by IMARPE and SANIPES for surveillance of IMNV in cultivation centres and tidal channels, Perú 2009 - 2019.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Farmed whiteleg Shrimp	-	-	-	25	393	56	120	130	120	281	289
Wild whiteleg Shrimp	1926	2809	1589	1956	-	-	-	-	84	32	14

Source: IMARPE and SANIPES (2020)

Table 7. Number of tests for IMNV undertaken by IMARPE and SANIPES, Perú (2009 - 2019)

Disease	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
IMNV	1926	2809	1589	1981	393	56	120	130	204	313	303	9,824

Source: IMARPE and SANIPES (2020)

c. Passive surveillance reported to SANIPES

As mentioned in point 2.1, in the event of a massive mortality event, the producers of white shrimp must report to SANIPES in order to determine the causal agent and apply the measures to control and eradicate the pathogen. In the last 3 years, mortalities attributed to Necrotizing Hepatopancreatitis (NHP), White Spot Virus (WSSV) and Taura Syndrome Virus (Table 8) have been reported, but mortalities attributed to IMNV have never been reported¹².

Table 8. Report of mortality attributed to infectious diseases or crop management, Perú, 2017-2019

YEAR	Number of reports on mortality	Causal agent			Other causes Hasbundry (*)
		WSSV	NHP	TSV	
2017	3	-	-	3	-
2018	25	5	5	-	15
2019	20	2	7	-	11

(*) The mortalities attributed to management were mainly due to problems associated with water quality (low oxygen concentration, excessive primary productivity, variations in pH, high concentrations of toxic compounds such as ammonia, nitrite), poor conditioning of post-larvae, among others.

¹² <https://revistasinvestigacion.unmsm.edu.pe/index.php/veterinaria/article/view/17275/14632>

4. Conclusion

Peru thus declares that the entire country is free of the Infectious Myonecrosis Virus (IMNV), given that the requirements for obtaining the disease-free status as set down in Chapter 1.4 of the Aquatic Animal Health Code (*Aquatic Code*) and Chapter 2.2.5. of the OIE Manual of Diagnostic Tests for Aquatic Animals (*Aquatic Manual*) (2019), have all been met.

Therefore, the country requests the publication of the self-declaration of absence of IMNV, as it has demonstrated that the basic conditions of biosafety have been consistently met for at least the last two years. Furthermore, active surveillance has been implemented for ten continuous years without any detection of IMNV, as carried out by both SANIPES and IMARPE.

Therefore, the Delegate of Peru before the OIE declares to the OIE that the country is free of IMNV, in accordance with article 9.5.4 (Chapter 9.5) point 2 of the *Aquatic Code* (2019).

Declaración que acompaña el documento de autodeclaración.

Yo, el/la abajo firmante,

Eva Luz Martínez Bermúdez

Delegado del Perú ante la Organización Mundial de Sanidad Animal (OIE), asumo la responsabilidad de la autodeclaración de ausencia de Virus de la Mionecrosis Infecciosa y Virus de la Cabeza Amarilla genotipo 1.

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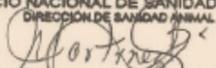
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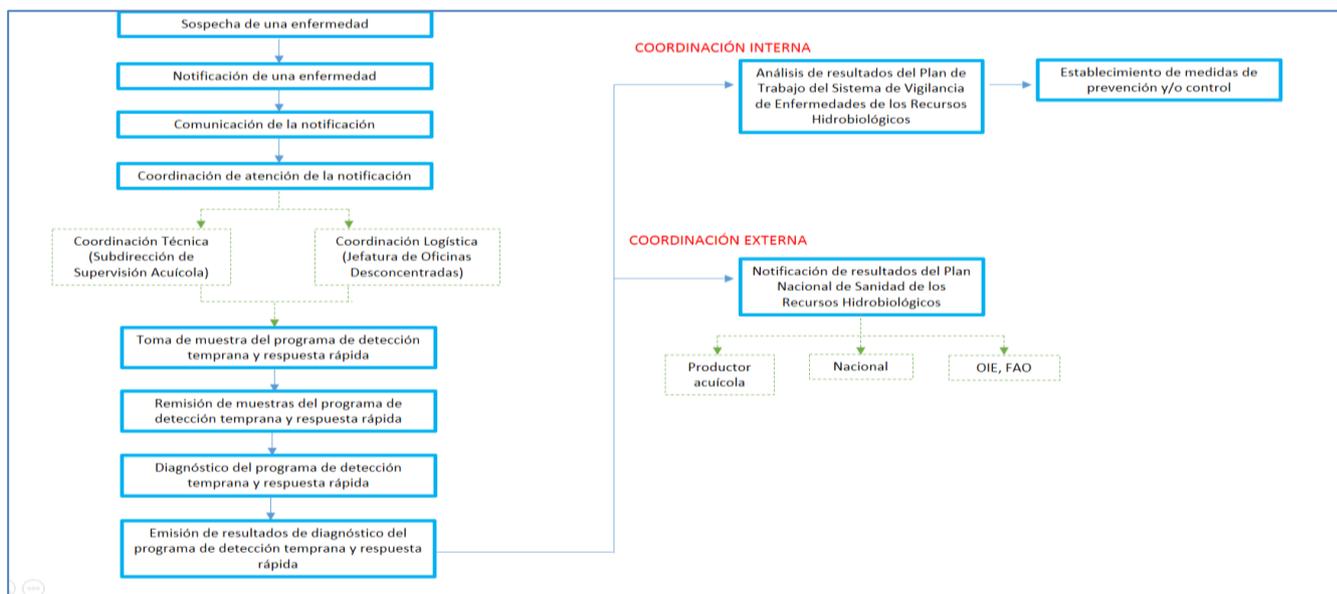
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Hecho el 31.1.01.2020

Firma del Delegado: **MINISTERIO DE AGRICULTURA Y RIEGO
SERVICIO NACIONAL DE SANIDAD AGRARIA
DIRECCIÓN DE SANIDAD ANIMAL**

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**M.V. Eva Luz Martínez Bermúdez
Directora General**

Annex 1. Early Warning Rapid Response Flowchart.



Oficinas Desconcentradas en el Perú



Annex 3. Post-larvae smuggling operations carried out by SANIPES OD inspectors - Tumbes (December 2017 - September 2019)

DATE	REGION	ZONE	FARMING CENTRE	COMMENTS
30/12/2017	Zarumilla	Zarumilla	Informal	Eliminación de Larvas
15/02/2018	La Cruz	Tumbes	Informal	Eliminación de Larvas
8/03/2018	Tuna Carranza	Tumbes	Informal	Eliminación de Larvas
9/03/2018	Aguas Verdes	Zarumilla	Informal	Eliminación de Larvas
9/03/2018	Chacra Gonzales	Zarumilla	Informal	Eliminación de Larvas
9/03/2018	Chacra Gonzales	Zarumilla	Informal	Eliminación de Larvas
9/03/2018	El Bendito	Zarumilla	Informal	Eliminación de Larvas
29/03/2018	Aguas Verdes	Zarumilla	Informal	Eliminación de Larvas
20/06/2018	Chacra Gonzales	Zarumilla	Informal	Eliminación de Larvas
20/06/2018	Chacra Gonzales	Zarumilla	Informal	Eliminación de Larvas
20/06/2018	Chacra Gonzales	Zarumilla	Informal	Eliminación de Larvas
6/10/2018	Aguas Verdes	Zarumilla	Informal	Eliminación de Larvas
28/11/2018	Zarumilla	Zarumilla	Informal	Eliminación de Larvas
15/09/2019	Zarumilla	Zarumilla	Informal	Eliminación de Larvas
21/09/2019	Aguas Verdes	Zarumilla	Informal	Eliminación de Larvas

• **Operations related to the use of post larvae from the natural environment**

In accordance with Ministerial Resolution No. 305-2004-PRODUCE, Art. 6°, natural and legal persons that extract, land and/or transport, retain, transform, market or use the shrimp resource from the natural environment during the national closure period, will be sanctioned in accordance with the provisions of Decree Law No. 25977, General Fisheries Law, and its Regulations, approved by Supreme Decree No. 102-2001-PE, the Regulations on Inspections and Sanctioning Procedures for Violations in Fishing and Aquaculture Activities, approved by Supreme Decree No. 008-2002-PE and other legal provisions in force.

Although there are not many reports of the use of wild post larvae, after the publication of the aforementioned resolution, SANIPES accompanies the operations carried out by the Ministry of Production, inspectors from the Regional Directorate of Production of Tumbes, the Public Prosecutor's Office and the National Police. Operations have been carried out on the beaches (natural habitat of the post larvae): Playa Santa Cruz, El Bendito, Acapulco and Playa Hermosa in the department of Tumbes. It should be noted that confiscated wild post larvae are returned to their natural environment.

The process of returning post larvae to the natural environment consists of:

- Locate the nearest beach.
- Open the bags containing the post larvae.
- Release the post larvae to their natural habitat.

Annex 7. Public and private laboratories dedicated to the diagnosis of diseases of hydrobiological resources

Laboratorio	Ubicación	Pruebas disponibles para el diagnóstico de IMNV
Laboratorio de Sanidad Acuicola del Organismo Nacional de Sanidad Pesquera (SANIPES)	Calle Miguel Grau 724, distrito de Tumbes, departamento de Tumbes	<p>RT-nested PCR en punto final</p> <p>Poulos B & Lightner D. 2006. Detection of Infectious Myonecrosis virus (IMNV) of penaeid shrimp by reverse-transcriptase polymerase chain reaction (RT-PCR). Dis Aquat Organ. 73(1): 69-72.</p> <p>RT - PCR en tiempo real</p> <p>Andrade T, Srisuvan T, Tang K & Lightner D. 2007. Real-time reverse transcription polymerase chain reaction assay using TaqMan probe for detection and quantification of Infectious myonecrosis virus (IMNV). Aquaculture. 264: 9-15.</p>
Laboratorio Costero de Tumbes del Instituto del Mar del Perú (IMARPE)	Centro Poblado de Nueva Esperanza, a la altura del km 1249 de la carretera Panamericana Norte - departamento de Tumbes	<p>RT-nested PCR. POULOS B.T. & LIGHTNER D.V. (2006). Detection of infectious myonecrosis virus (IMNV) of penaeid shrimp by reverse-transcriptase polymerase chain reaction (RT-PCR). Dis. Aquat. Org., 73, 69–72.</p>
Biodes Laboratorios Soluciones Integrales S.R.L.	Av. Piura N°500 -Interior 13- 2do piso - departamento de Tumbes	<p>RT-nested PCR. POULOS B.T. & LIGHTNER D.V. (2006). Detection of infectious myonecrosis virus (IMNV) of penaeid shrimp by reverse-transcriptase polymerase chain reaction (RT-PCR). Dis. Aquat. Org., 73, 69–72.</p>
Inca Biotec S.A.C	Jr. Filipinas N° 212 - departamento de Tumbes	<p>RT-nested PCR. POULOS B.T. & LIGHTNER D.V. (2006). Detection of infectious myonecrosis virus (IMNV) of penaeid shrimp by reverse-transcriptase polymerase chain reaction (RT-PCR). Dis. Aquat. Org., 73, 69–72.</p>
Bioservice	Av. Nicolás de Piérola N° 1228 Villa María del Triunfo – departamento de Lima	Método de diagnóstico para IMNV en proceso de implementación.
Laboratorio de Ictiopatología de la Facultad de Medicina Veterinaria – Universidad Nacional Mayor de San Marcos	Av. Circunvalación Cdra. 28 - San Borja - departamento de Lima	Servicio de diagnóstico de histopatología de langostinos
Laboratorios de la Facultad de Medicina Veterinaria - Universidad Peruana Cayetano Heredia	Av. Honorio Delgado N° 430- San Martin de Porres - departamento de Lima	Método de diagnóstico para IMNV en proceso de implementación.
Life Diagnostics S.A.C.	Calle San Juan N°156 Urb. Javier Prado Sexta Etapa- Ate Vitarte - departamento de Lima	Método de diagnóstico para IMNV en proceso de implementación.

Annex 8. Research projects carried out by SANIPES for health control

Proyecto	Objetivo	Estado	Publicación realizada
"Determinación de la presencia de la cepa patogénica de <i>Vibrio parahaemolyticus</i> que contiene los genes Pir A Pir B en los centros de cultivo de langostino blanco (<i>Litopenaeus vannamei</i>)"	Determinación de la presencia de AHPND, así como fortalecer capacidades en medidas de prevención y control ante posible brote del patógeno	Finalizado	"Efforts to prevent and control possible introduction of Acute Hepatopancreatic Necrosis Disease (AHPND) in Peru" (en proceso de publicación en FAO Aquaculture Newsletter)
"Identificación de los principales factores de riesgo asociados a la presencia de la enfermedad emergente virus de la tilapia lacustre (TiLV) a nivel nacional"	Identificar los principales factores de riesgo asociados a la introducción del Virus de la Tilapia Lacustre (TiLV) que afectan la producción sostenible de tilapia en el país.	Finalizado	"Recent efforts and actions undertaken by Peru against the tilapia lake virus (TiLV)" FAO Aquaculture Newsletter No. 60, August 2019
"Determinación de la prevalencia y genotipo del Virus de la Necrosis Pancreática Infecciosa VNPI en la trucha arcoíris (<i>Oncorhynchus mykiss</i>) en el Perú"	Determinar la prevalencia y genotipo del Virus de la Necrosis Pancreática Infecciosa VNPI en la trucha arcoíris (<i>Oncorhynchus mykiss</i>) en los departamentos productores a nivel nacional.	Vigente	En proceso
"Reforzamiento de la vigilancia sanitaria para la prevención y control de agentes infecciosos causantes de enfermedades en langostinos del género <i>Litopenaeus</i> procedentes de centros de cultivo y áreas naturales de las zonas de Tumbes y Piura"	Reforzar la vigilancia sanitaria para la prevención y control de agentes infecciosos causantes de enfermedades en langostinos del género <i>Litopenaeus</i> procedentes de Centros de cultivo y Áreas naturales de las zonas de Tumbes y Piura, en el Perú	Finalizado	<ul style="list-style-type: none"> • "Vigilancia sanitaria de peneidos silvestres en los principales canales de marea de Tumbes, Perú" (en proceso de publicación en la Revista de Investigaciones Veterinarias del Perú) • "Prevalencia y estacionalidad de las principales enfermedades infecciosas que afectan a langostino blanco (<i>Penaeus vannamei</i>) de cultivo en Perú" (en proceso de revisión en la Revista de Investigaciones Veterinarias del Perú)
"Análisis de Riesgo Sanitario para el control de la introducción, exposición, establecimiento y diseminación de los agentes patógenos asociados a la importación de ovas embrionadas de trucha arco iris en Puno"	Desarrollar un análisis de riesgo sanitario para el control de la introducción, exposición, establecimiento y diseminación de los agentes patógenos asociados a la importación de ovas embrionadas de trucha arco iris (<i>Oncorhynchus mykiss</i>), en la región Puno (Perú).	Vigente	En proceso
"Análisis de riesgo en la importación de post larvas del langostino en las regiones de Tumbes y Piura"	Proporcionar un análisis transparente en el que se evalúen los riesgos de enfermedad asociados a la importación de post larvas de langostino para justificar las condiciones impuestas para la importación	Vigente	En proceso

Annex 9 . Additional information on Biosecurity measures

In Peru, the importation and movement of patiblanco (live) shrimp is only done in the post-larva stage. In that sense, the biosafety and bioprotection measures related to the commercialization and movement of these organisms, consist in

- a. Use of post larvae coming only from laboratory,
- b. Import Health Certificate, in which it is declared that the post larvae are free of diseases of obligatory notification before the OIE,
- c. Discard diseases in post larvae imported by SANIPES and
- d. Active surveillance carried out by SANIPES, to the national post-larvae production laboratory, for the elimination of diseases of obligatory notification to the OIE.

✓ Use of post-larvae from laboratory only

In the case of white shrimp post larvae, marketing, transport and use for aquaculture purposes are only permitted when the specimens come from domestic or foreign artificial production centres or laboratories. In Peru, since 2004, the extraction of wild post lavas as seed for aquaculture has been prohibited, due to the high risk of spreading diseases, mainly due to White Spot Virus.

Please see Evidence 1

✓ Import health certificate

In the case of imported post-larvae, each import consignment must be accompanied by a health certificate ensuring that the animals are free of NIVM and other notifiable diseases affecting penetrated animals. At present, only post larvae of white shrimp are imported from Ecuador and Colombia, with which health certificates declaring that the organisms are free of IMNV have been harmonized.

✓ Dispose of diseases in post larvae

Likewise, when the post-larvae enter Peru, SANIPES takes samples of the imported merchandise in order to rule out diseases and corroborate what is declared in the health certificate.

✓ Post larvae production laboratory monitored by SANIPES

In the case of post-larvae produced in Peru, there is currently only one laboratory that produces seed for its own supply, which is also continuously monitored by the health authority, through the Work Plan of the Hydrobiological Resources Surveillance System.