

I Congreso de Acuicultura de la República Dominicana

La Tilapicultura Dominicana,
Retos Sanitarios Frente A
Patógenos Emergentes Y
Reemergentes.

¹Francisco De la Rosa Gómez, profesor investigador de la UCE

²Diogenes Castillo, Investigador Del Instituto De Investigaciones Agropecuarias Y Forestales (IDIAF).



Actualización sobre las enfermedades emergentes, reemergentes y nuevas.

- Virales
- Bacterianas
- Parasitarias

Ocultar las enfermedades o prevenirlas y controlarlas?

- A nivel mundial las enfermedades de los animales acuáticos son una de las limitaciones más graves para la expansión y desarrollo de la acuicultura sostenible, provoca el 20% de las pérdidas de la producción, y son ocasionadas por virus, bacterias, parásitos y hongos.

- Tres niveles de diagnósticos según la FAO

Nivel I: Observaciones en la granja, signos, lesiones, necropsias, registro productivo, manejo sanitario. Kit de calidad de agua y parámetros ambientales

Nivel II: Estudios especializados: Parasitología, histopatología, bacteriología y micología

Nivel III: Diagnósticos avanzados: moleculares, inmunológicos, ultramicroscópicos.
Altas tasas de mortalidad en alevines, enfermedades emergentes de origen viral, bacterianos y parasitarios.

Table I.6.1 Diagnostic Levels, Associated Requirements and Responsibilities.

Level	Activity	Work requirements	Responsibility	Technical requirements to support activities
I	<p>Observation of animal and environment</p> <p>Gross clinical examination</p>	<p>Knowledge of normal (feeding, behaviour, growth) of stock.</p> <p>Frequent / regular observation of stock.</p> <p>Regular, consistent record-keeping and assistance (Levels II, III). maintenance of records – including fundamental environmental information.</p> <p>Knowledge contacts for health diagnosis</p> <p>Ability to submit and/or preserve representative specimens for optimal diagnosis (Levels II, III).</p>	<p>Farm worker/manager.</p> <p>Fishery extension officers.</p> <p>On-site veterinary support.</p> <p>Local fishery biologists.</p>	<p>Field keys.</p> <p>Farm record keeping formats.</p> <p>Equipment lists</p> <p>Model clinical observation sheets.</p> <p>Pond/Site record sheets.</p> <p>Preservation/transportation guidelines for Levels II/III diagnoses.</p> <p>Model job descriptions/skill requirements.</p> <p><i>Asia Diagnostic Guide for Aquatic Animal Diseases</i></p>
II	<p>Parasitology</p> <p>Bacteriology</p> <p>Mycology</p> <p>Histopathology</p>	<p>Laboratories with basic equipment and personnel trained/experienced in aquatic animal pathology.</p> <p>Keep and maintain accurate diagnostic and laboratory case records.</p> <p>Ability to preserve and storage specimens for optimal Level III diagnoses.</p> <p>Knowledge of/ contact with different areas of specialisation within Level II.</p> <p>Knowledge of who to contact for Level III diagnostic assistance.</p>	<p>Fish biologists/ technicians.</p> <p>Aquatic Veterinarians.</p> <p>Parasitologists/ technicians.</p> <p>Mycologists/ technicians</p> <p>Bacteriologists/ technicians.</p> <p>Histopathologists/ technicians.</p>	<p>Model laboratory record-keeping system</p> <p>Protocols for preservation/ transport of samples to Level III</p> <p>Model laboratory requirements/ equipment/ consumables lists</p> <p>Model job descriptions/ skill lists</p> <p>Access to Level II and Level III specialist expertise</p> <p><i>Asia Diagnostic Guide for Aquatic Animal Diseases</i> <i>OIE Diagnostic Manual for Aquatic Animal Diseases</i> <i>Regional General Diagnostics Manuals</i></p>
III	<p>Virology</p> <p>Electron microscopy</p> <p>Molecular biology</p> <p>Immunology</p>	<p>Highly equipped laboratory with highly specialised and trained personnel.</p> <p>Keep and maintain accurate diagnostic and laboratory case records.</p> <p>Preserve and store specimens.</p> <p>Maintenance of contact with people</p>	<p>Virologist/ technician.</p> <p>Ultrastructural histopathologist/ technicians.</p> <p>Molecular biology scientists/ technicians.</p>	<p>Model laboratory requirements/ equipment/ consumables lists</p> <p>Model job descriptions/ skill requirements</p> <p>Contact information for reference laboratories</p> <p>Protocols for preservation of samples for consultation/ validation</p> <p><i>Asia Diagnostic Guide for Aquatic Animal Diseases</i></p>

Universidad Autónoma de Santo Domingo
Facultad de Ciencias Agronómicas y Veterinarias
Escuela de Medicina Veterinaria

“Presencia de bacterias potencialmente patógenas en *Oreochromis niloticus*
(Tilapia Nilótica)”

Tesis de grado para obtener el título de:
Licenciado en Medicina Veterinaria

Sustentantes:

Diana Cecilia Ceballos Francisco CH-1578
María del Pilar Hernández Rodríguez CH-7830

Asesores:

Dra. Argentina Figueroa
Lic. Francisco De La Rosa

JOURNAL OF **FISH DISEASES**

Francisella sp., an emerging pathogen of tilapia, *Oreochromis niloticus* (L.), in Costa Rica

E Soto, J P Hawke, D Fernandez, J A Morales

First published: 16 July 2009 | <https://doi.org/10.1111/j.1365-2761.2009.01070.x> | Citations: 104

✉ *Dr J P Hawke, Louisiana State University, Department of Pathobiological Sciences, School of Veterinary Medicine, Skip Bertman Dr, Baton Rouge, LA 70803, USA (e-mail: jhawke1@lsu.edu)*



Tilapia Lake Virus (TiLV) disease: Current status of understanding

Nilav Aich ^a, Anirban Paul ^b, Tanmoy Gon Choudhury ^c ✉, Himadri Saha ^c

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<https://doi.org/10.1016/j.aaf.2021.04.007>

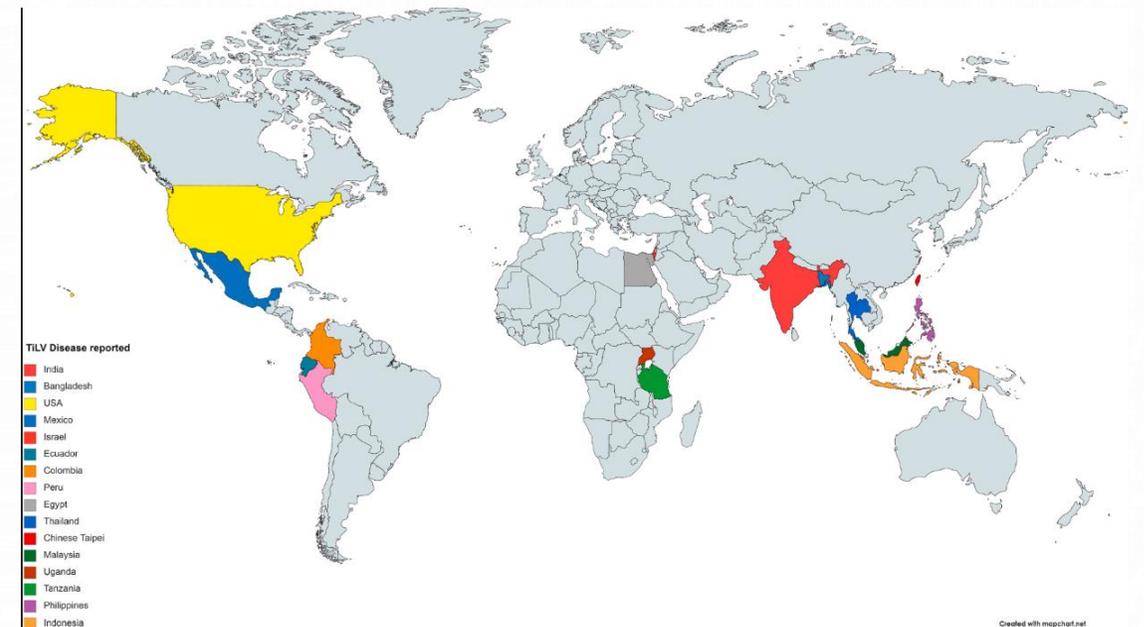
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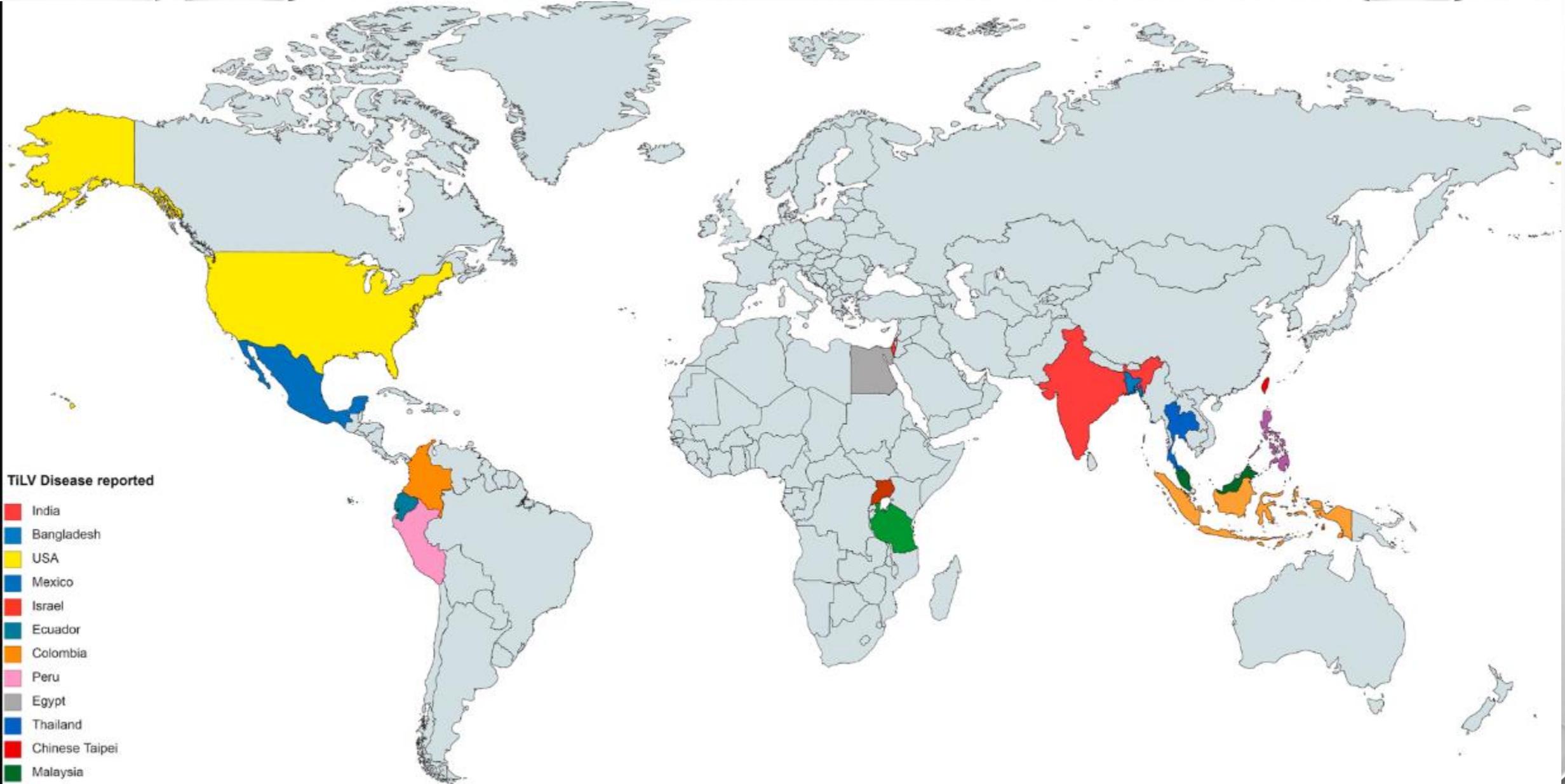
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Abstract

Tilapia Lake Virus (TiLV) disease is an emerging and transboundary disease of





TILV Disease reported

- India
- Bangladesh
- USA
- Mexico
- Israel
- Ecuador
- Colombia
- Peru
- Egypt
- Thailand
- Chinese Taipei
- Malaysia
- Uganda
- Tanzania
- Philippines
- Indonesia

- Un brote aleatorio en un centro de investigación apunta a variantes de tilapia que pueden resistir el virus mortal
- **4 DE MARZO DE 2020**
- POR [ERIK STOKSTAD](#)

Emerging, re-emerging, new viral infections of tilapia

Re-emerging	Lymphocystis disease virus (LCDV)	<i>Lymphocystivirus</i>	Case reports with little concern	
	Infectious pancreatic necrosis virus (IPNV)	<i>Aquabimavirus</i>		
	Bohle virus	<i>Ranavirus</i>		
Emerging	Iridovirus-like	<i>Iridoviridae</i>		
	Viral nervous necrosis (VNN)	<i>Betanodavirus</i>		
	Infectious spleen and kidney necrosis virus (ISKNV)	<i>Megalocytivirus</i>		
New/ newly emerging	Tilapia larvae encephalitis virus (TLEV)	<i>Herpesvirus</i>		Global concern
	Tilapia lake virus (TiLV)	<i>Tilapinevirus</i>		



Food and Agriculture
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FAO/China Intensive Training Course on Tilapia Lake Virus (TiLV)
Sun Yat Sen University, Guangzhou, China
18-24 June 2018

Session 2

Ha Thanh Dong^{1,2}

**Emerging, re-emerging and new
diseases of tilapia**

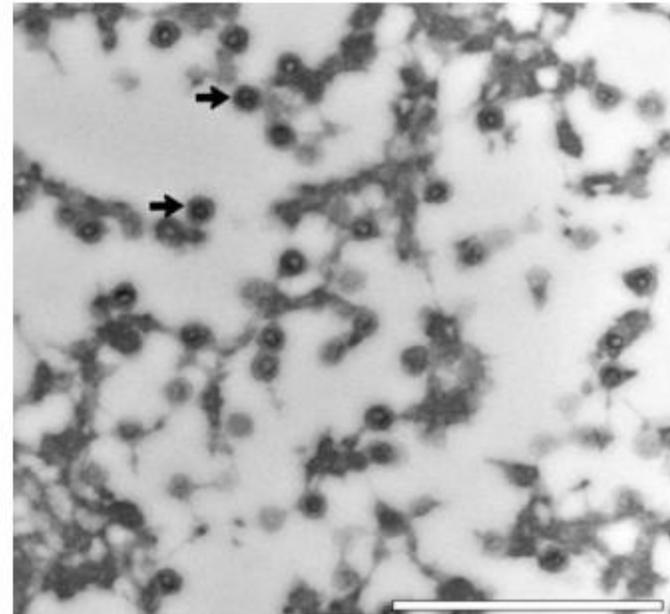
Viral Nervous Necrosis (VNN) disease

- ❖ **Causative agent:** *Betanodavirus*
- ❖ **Clinical signs:** signs of neurological disorders: loss of balance, erratic swimming
- ❖ **Host:** >30 species, mainly in marine fish
- ❖ **Geographical distribution:** worldwide
- ❖ **Cases in tilapia** (France, Thailand & Indonesia)
 - e.g. a case in tilapia hatchery
 - 10 days-old larvae of tilapia
 - Mortality 90-100%
 - Histopathological manifestation of VNN disease
 - 93.07–93.88% similarity to red-spotted grouper nervous necrosis virus (RGNNV)

Keawcharoen et al. JFD 2015, 38, 49-54

Infectious spleen and kidney necrosis disease (ISKND)

- ❖ **Synonym:** Iridoviral disease (common name), red sea bream iridoviral disease (OIE)
- ❖ **Causative agent:** *Megalocytivirus* ISKNV
- ❖ **Clinical signs:** darkening, pale gills
- ❖ **Host:** wide range of both marine and freshwater fish, including tilapia



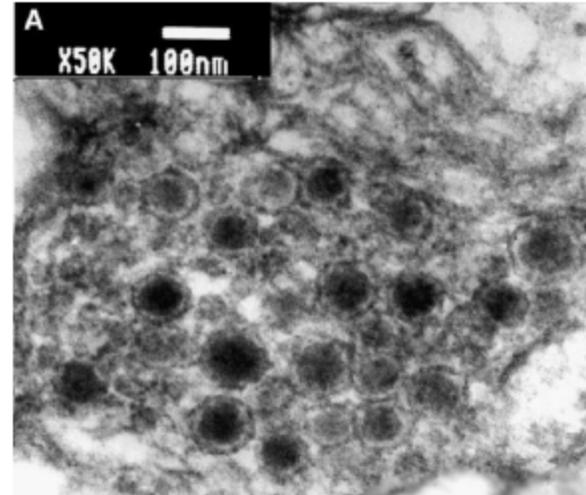
Subramaniam et al. (2016)

Tilapia larvae encephalitis virus (TLEV) disease

- ❖ **Causative agent:** TLEV/Herpes-like virus
- ❖ **Clinical signs:** spiral swimming
- ❖ **Host:** blue tilapia (*O. aureus*), red tilapia (*Oreochromis* sp.), Nile tilapia (*O. niloticus*)
- ❖ **Mortality:** reach up to 98%
- ❖ **Susceptible stages:** 32-34 days post fertilization
- ❖ **Geographical distribution:** Israel
- ❖ **Histopathological feature:** Not available
- ❖ **PCR detection:** available

TLEV-1(5' TCGTGGGCCTTATCCCGCGT 3')

TLEV-2 (5' GAGACCAGAAAGTGCTTCTC 3')



Lack of investigation
in other countries

Bacterial Diseases in Tilapia

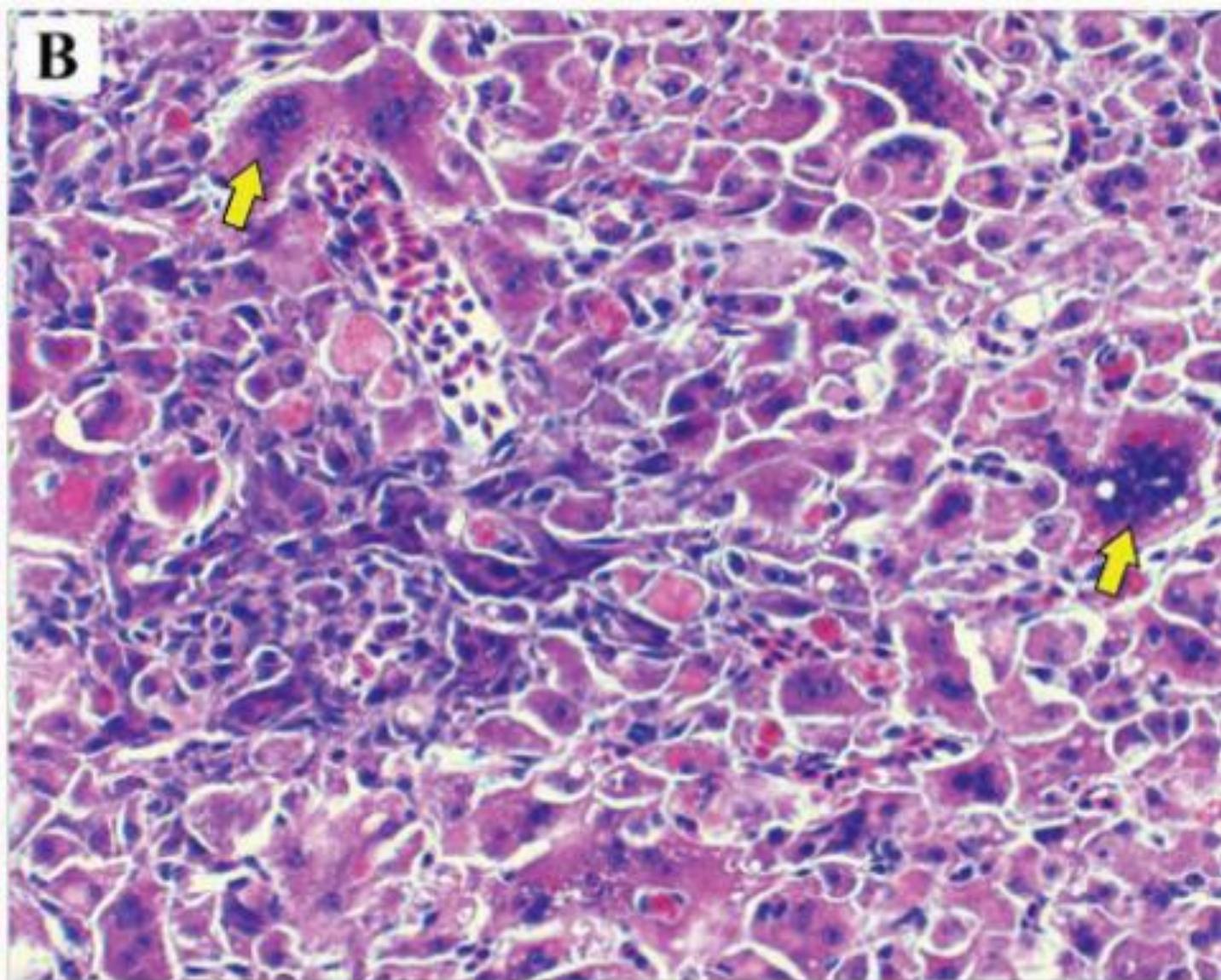
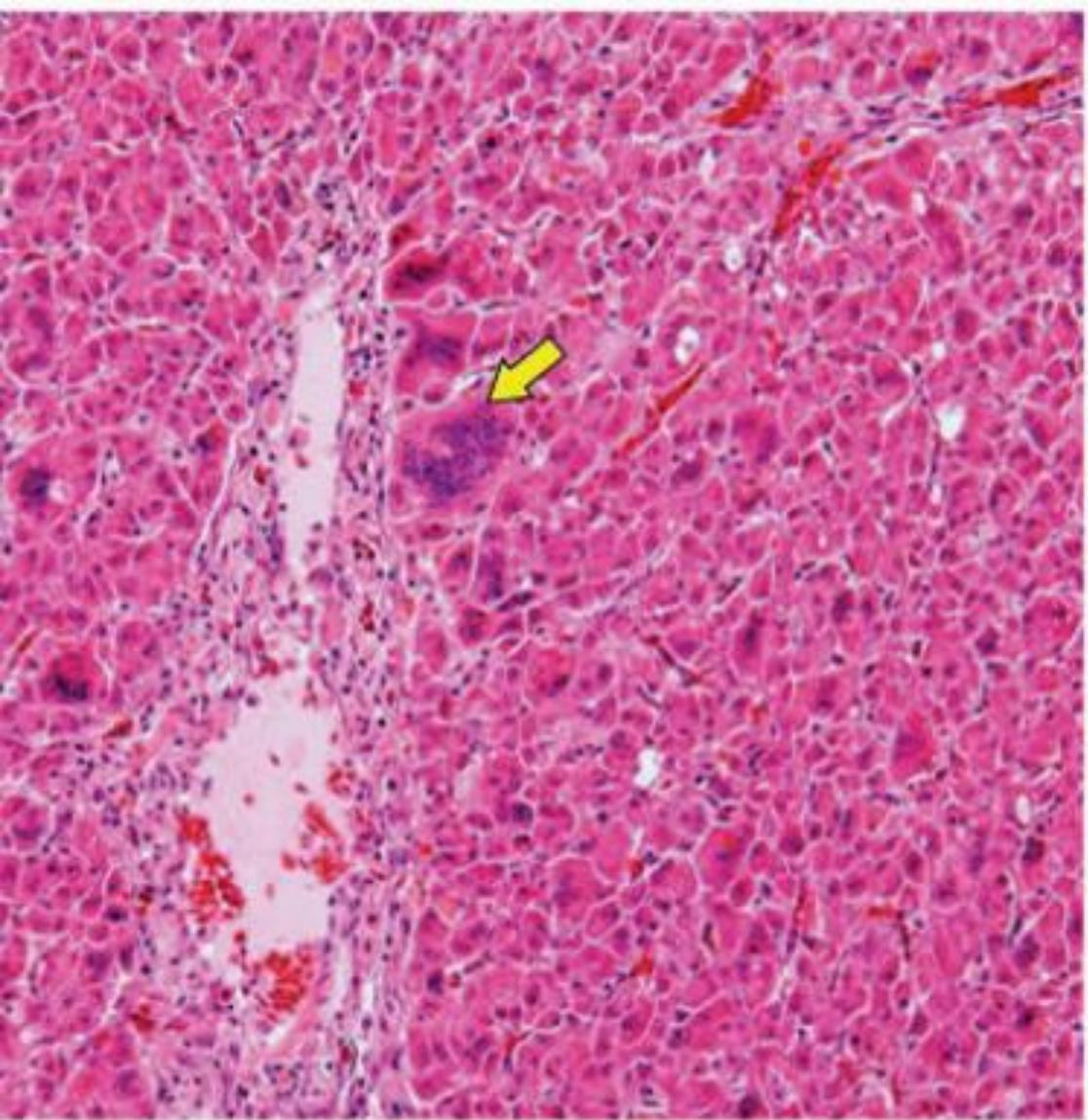
- ❖ Streptococcosis – Emergence of *S. agalactiae* serotype IX
 - ❖ Columnaris – Complexity of *F. columnare*
 - ❖ Francisellosis – Emerging/re-emerging in some countries
 - ❖ Hemorrhagic septicemia
 - *A. hydrophila*
 - Non-*A. hydrophila* (*A. veronii* & *A. jandaei*) (Dong et al. JFD 2017)
 - ❖ Edwardsiellosis caused by *E. ictaluri*
 - ❖ *Aerococcus viridans* infection (Ke et al. Aquaculture 2012)
 - ❖ Hahellosis/red egg disease (Senapin et al. Aquaculture 2016)
 - ❖ Unknown diseases
- New to tilapia

Un virus emergente está matando a los peces de cultivo, pero los criadores pueden ayudarlos a defenderse

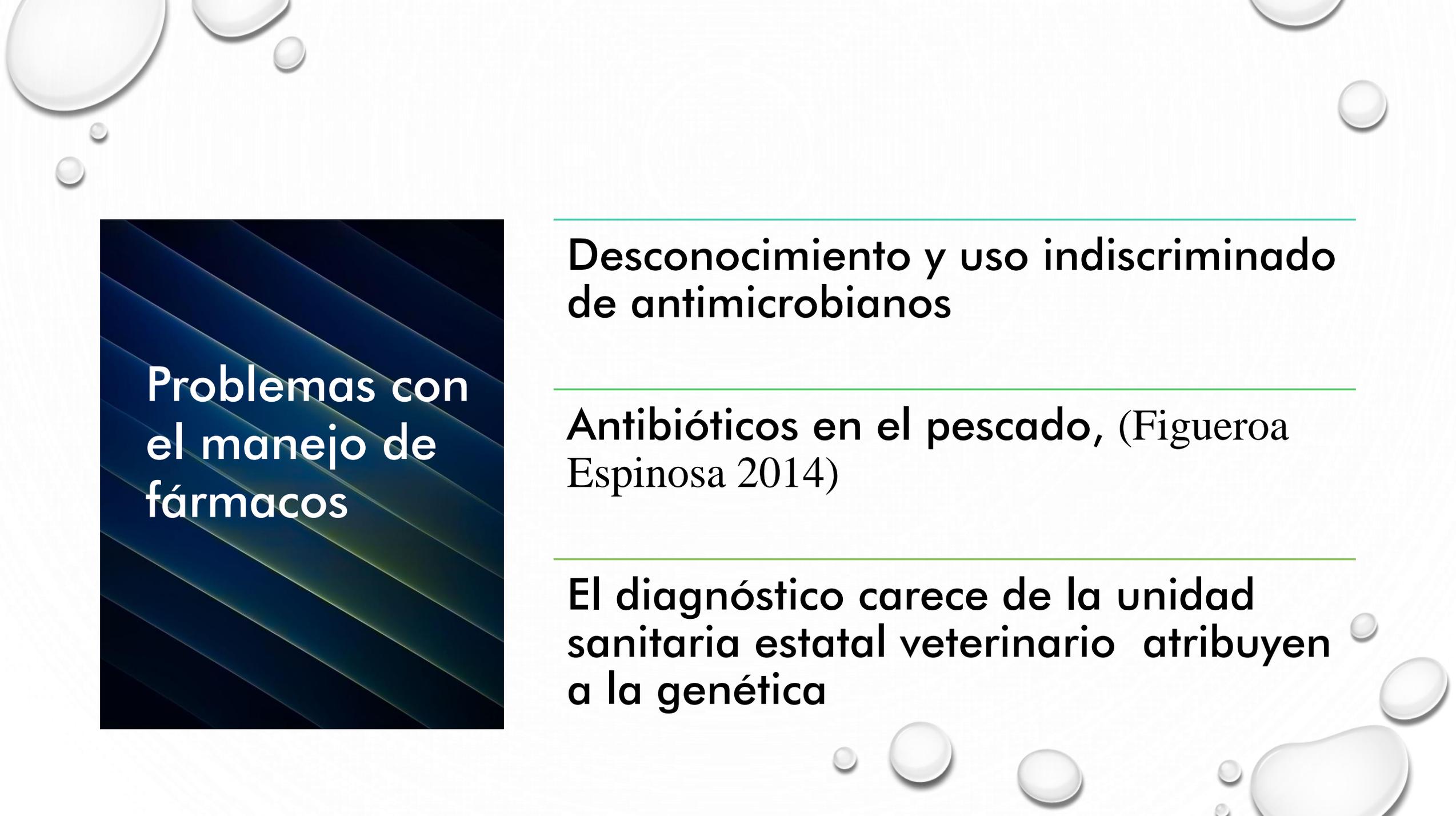
Un brote aleatorio en un centro de investigación apunta a variantes de tilapia que pueden resistir el virus mortal

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iver from moribund tilapia showing syncytial giant cells
A (H&E, 110x) and B (H&E, 400x).



**Problemas con
el manejo de
fármacos**

**Desconocimiento y uso indiscriminado
de antimicrobianos**

**Antibióticos en el pescado, (Figueroa
Espinosa 2014)**

**El diagnóstico carece de la unidad
sanitaria estatal veterinario atribuyen
a la genética**

- **Materiales y métodos.**

- Se hizo una revisión del estado de las enfermedades en tilapias; de igual forma se condujo una entrevista a productores y técnicos, por último se realizaron evaluaciones en ocho granjas abarcando alevines, juveniles y reproductores; se describen los signos y lesiones encontrados, la histopatología, microbiología y pruebas PCR.

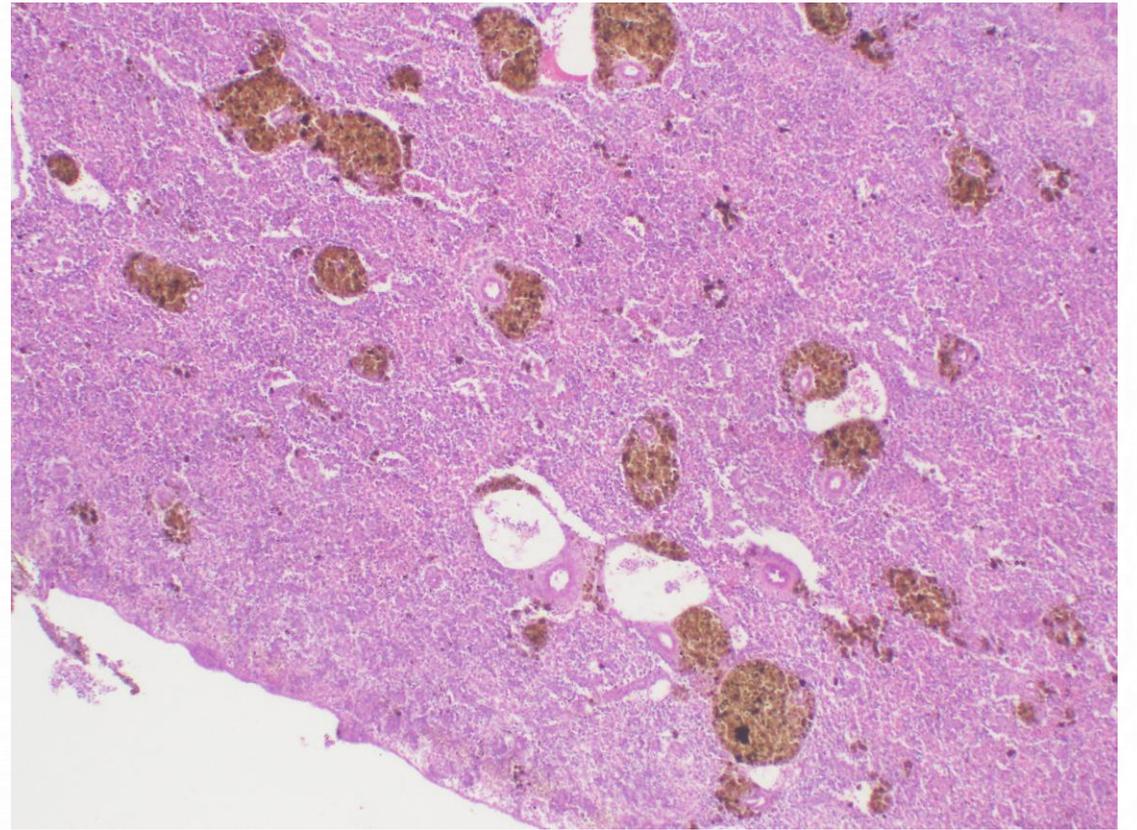
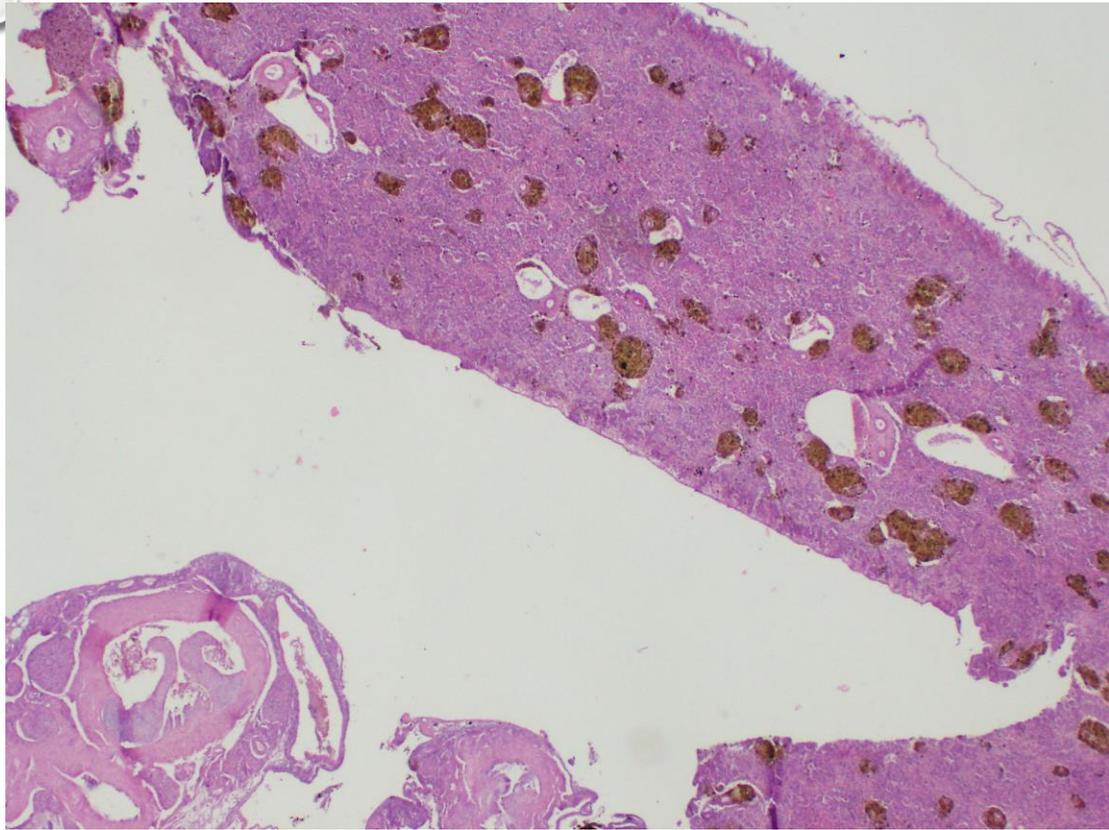


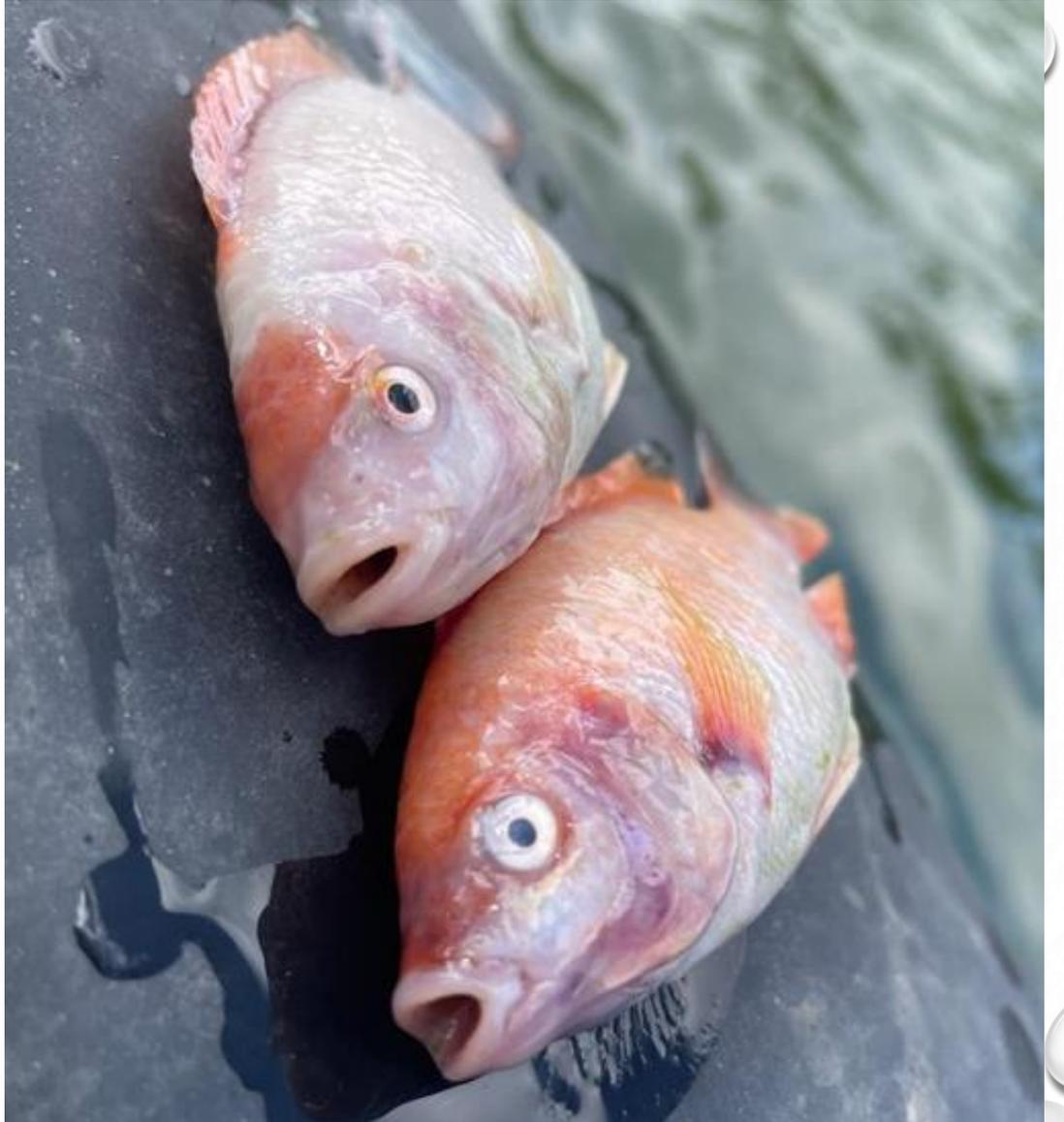
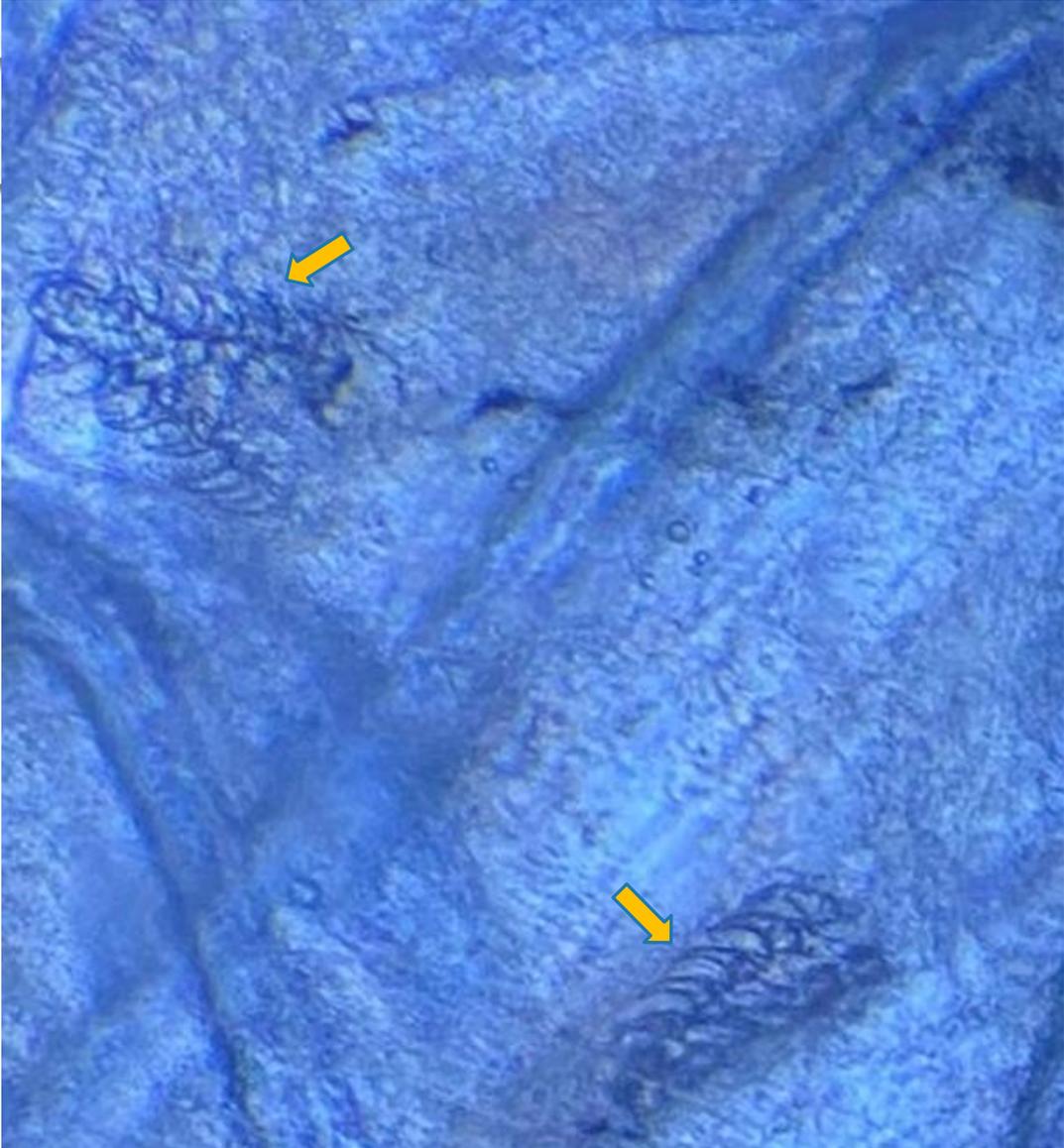
RESULTADOS DETERMINACION PRESENCIA DE RESIDUOS DE ANTIBIOTICOS

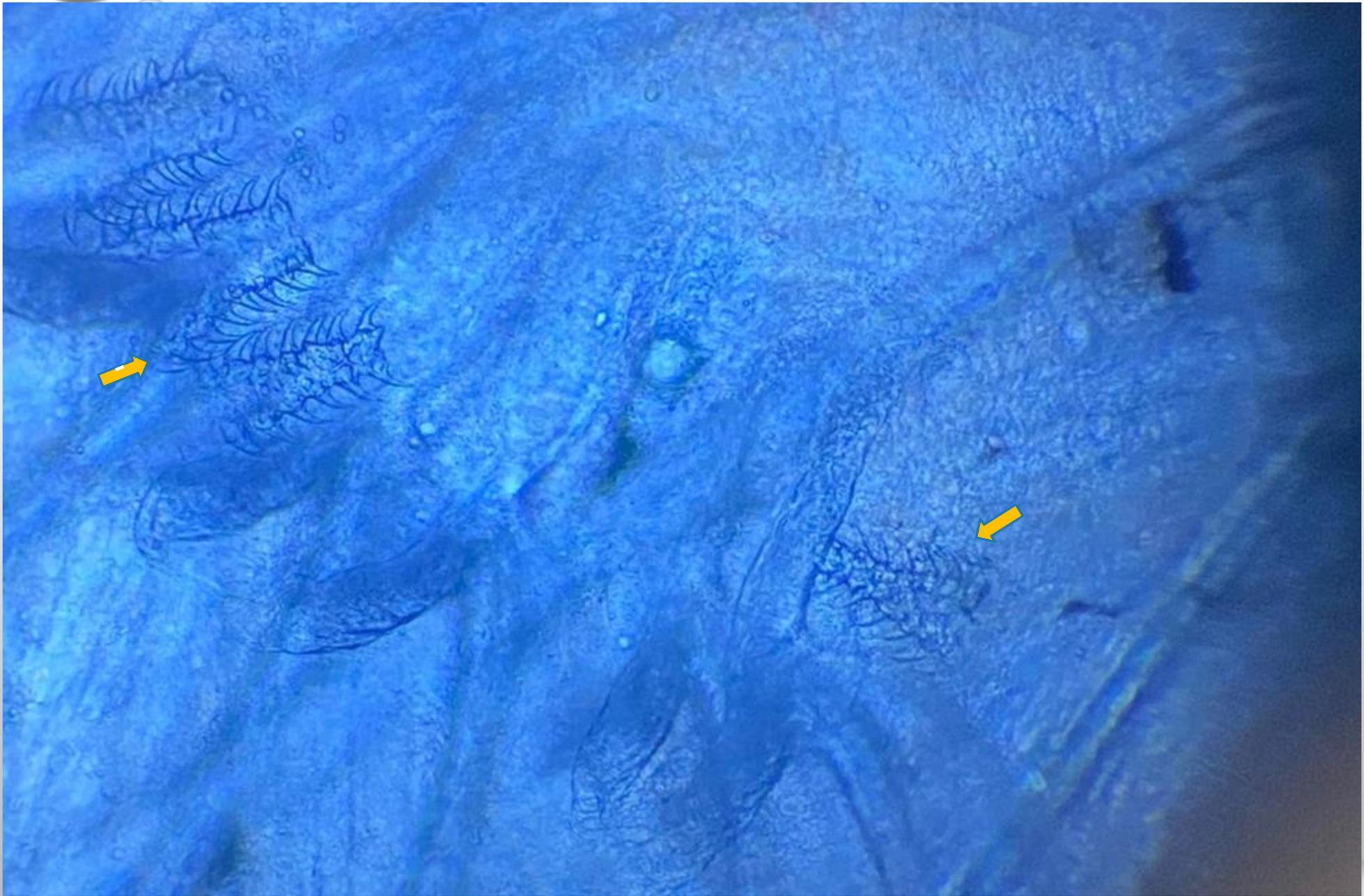
GRANJAS	RESULTADOS	SUSTANCIAS	VALORES	LMR
Monte plata 1	positivo	Tetraciclina	0.6	100
Monte plata 2	negativo			
Azua	negativo			
Santiago	positivo	Estreptomicina	1.5	0-50
Sánchez Ramirez	negativo			
Monte Plata 3	negativo			

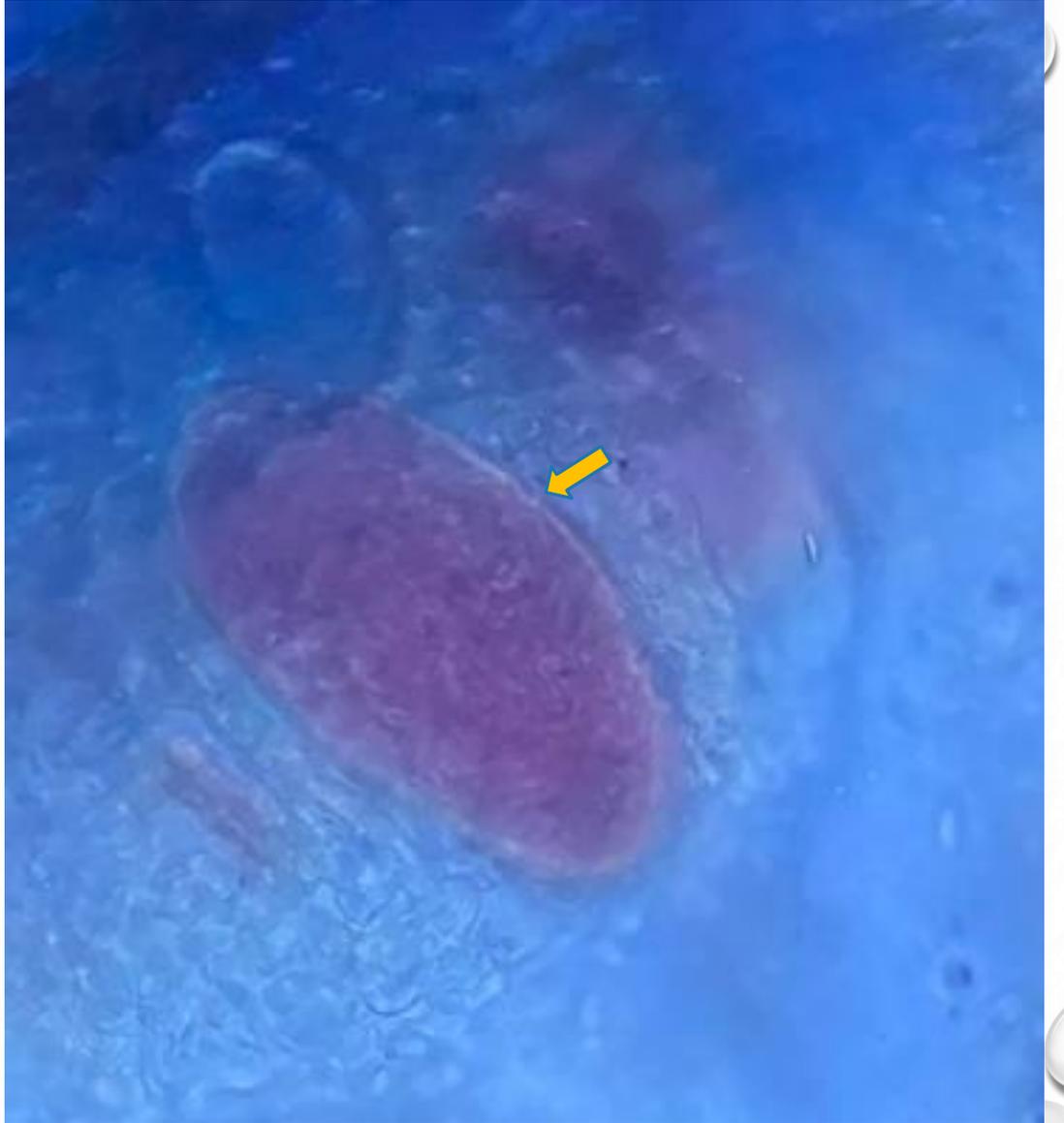
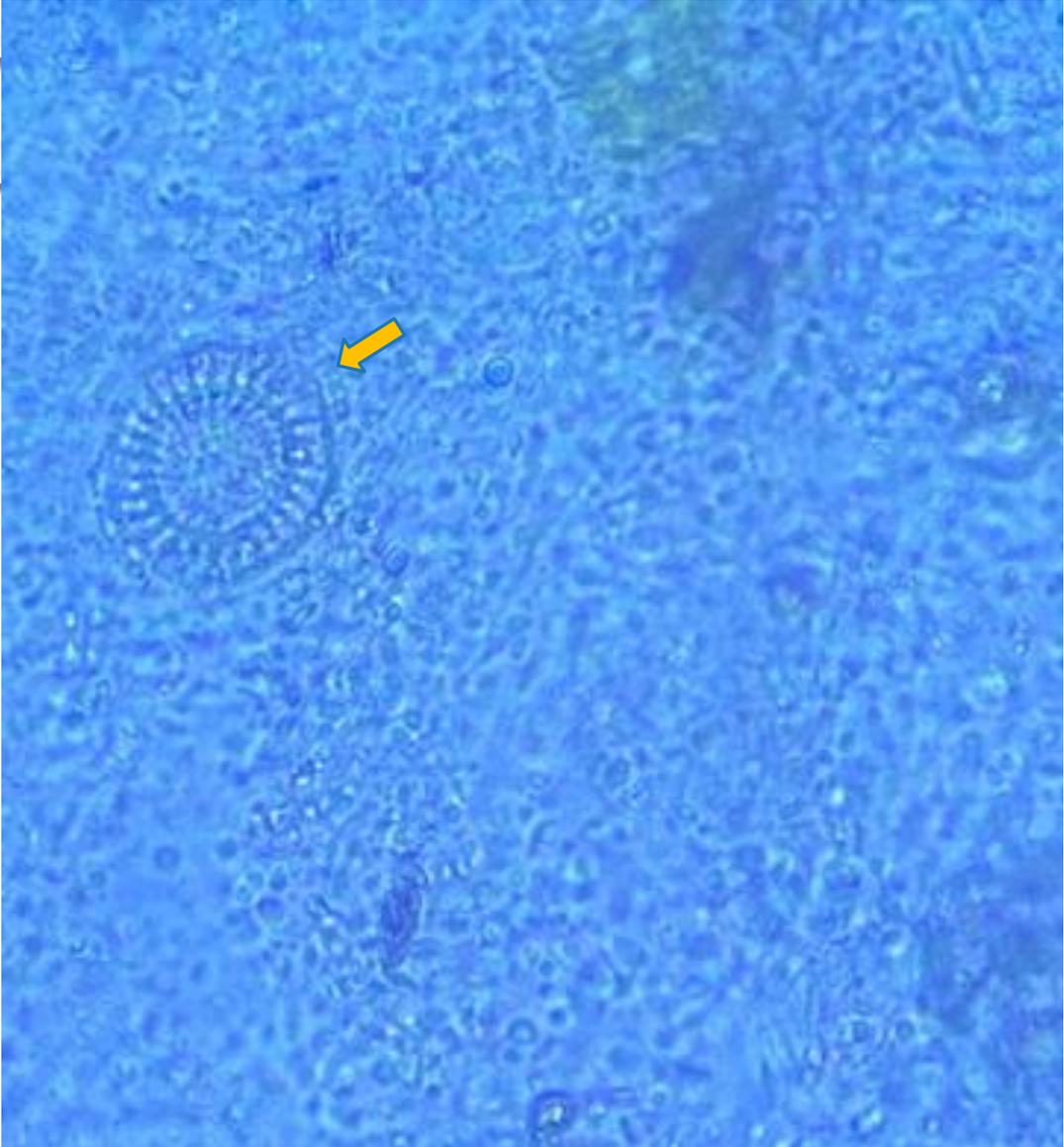
Fuente: Resultados obtenidos de las muestras remitidas al LAVECEN.

(Figueroa Espinosa 2014)









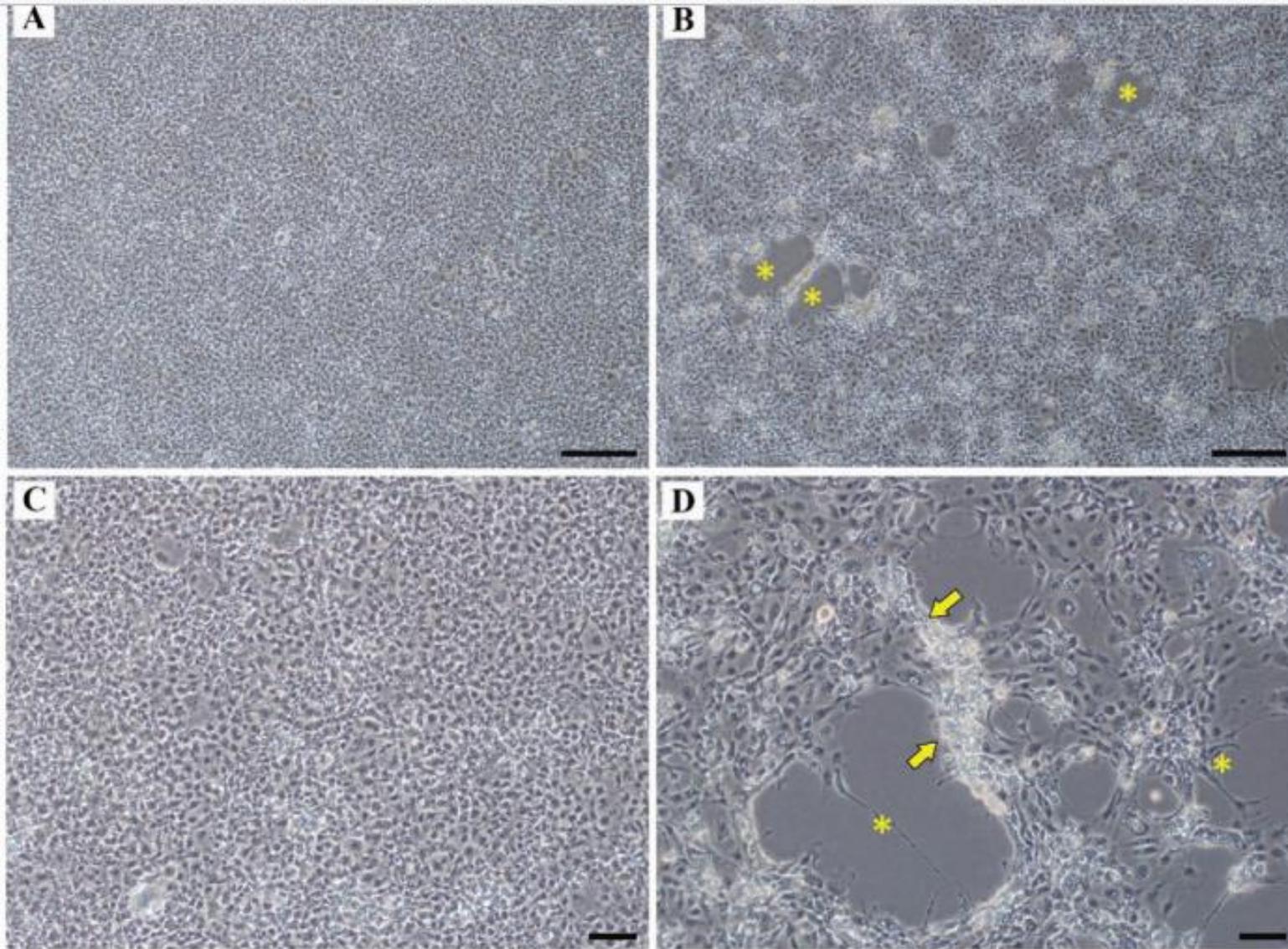


Figure 7. Uninfected SSN-1 cells (A & C). Infected SSN-1 cells (6 days post inoculation) showing multiple plaques (asterisks) and associated vacuolated cells (arrows) at the edge of the plaques (B & D). Scale bar 50 μm (C & D), Scale bar 200 μm (A & B).

What are recommendations for fish farmers to prevent TiLV outbreaks? Fish farmers are urged to purchase fingerlings only from tested TiLV-free sources and to work with their local aquaculture Extension agent and fish health professional to tailor an appropriate health management and biosecurity plan. USDA-Southern Regional Aquaculture Center



**Ausencia de cultura
veterinaria en la acuicultura**



La genética lo decide todo

La acuicultura nacional muestra gran actividad aunque están ausentes las previsiones sanitarias y los registros censales. Las universidades no tienen en el pensum veterinario el manejo sanitario de las explotaciones acuícolas, con la excepción de la UCE

infecciosas. La experiencia actual es ya suficiente para poder afirmar sin miedo a equivocarse que la enfermedad es un factor de singular importancia, que limita considerablemente el potencial productivo y la rentabilidad comercial de las empresas de acuicultura.

Resultados y discusión

Los signos observados, nado lento en la superficie, inapetencia, hepatomegalia, úlceras y pérdida de escamas, palidez de branquias, distensión abdominal, enoftalmia, oscurecimiento de la piel, hemorragias en opérculos y área rostral, palidez de gónadas masculinas, exoftalmia.

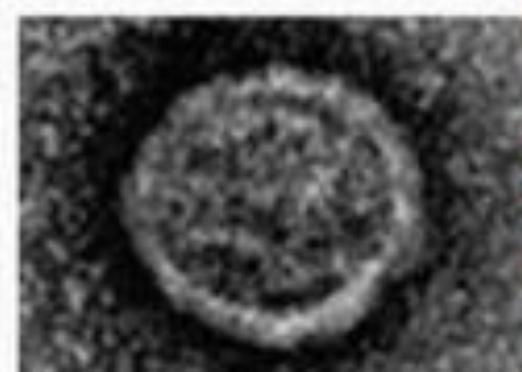
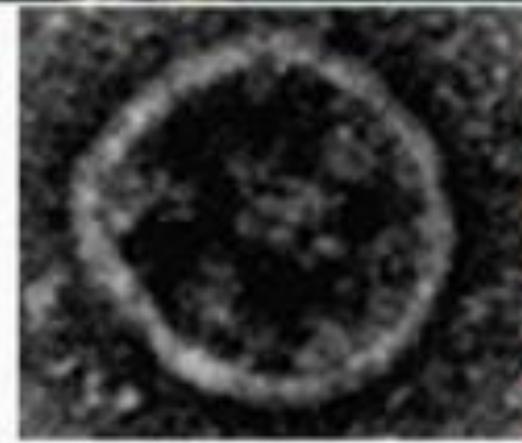
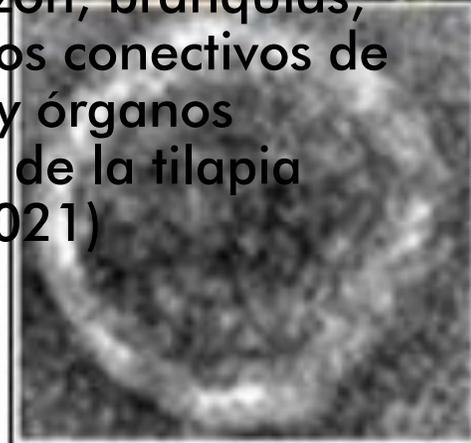




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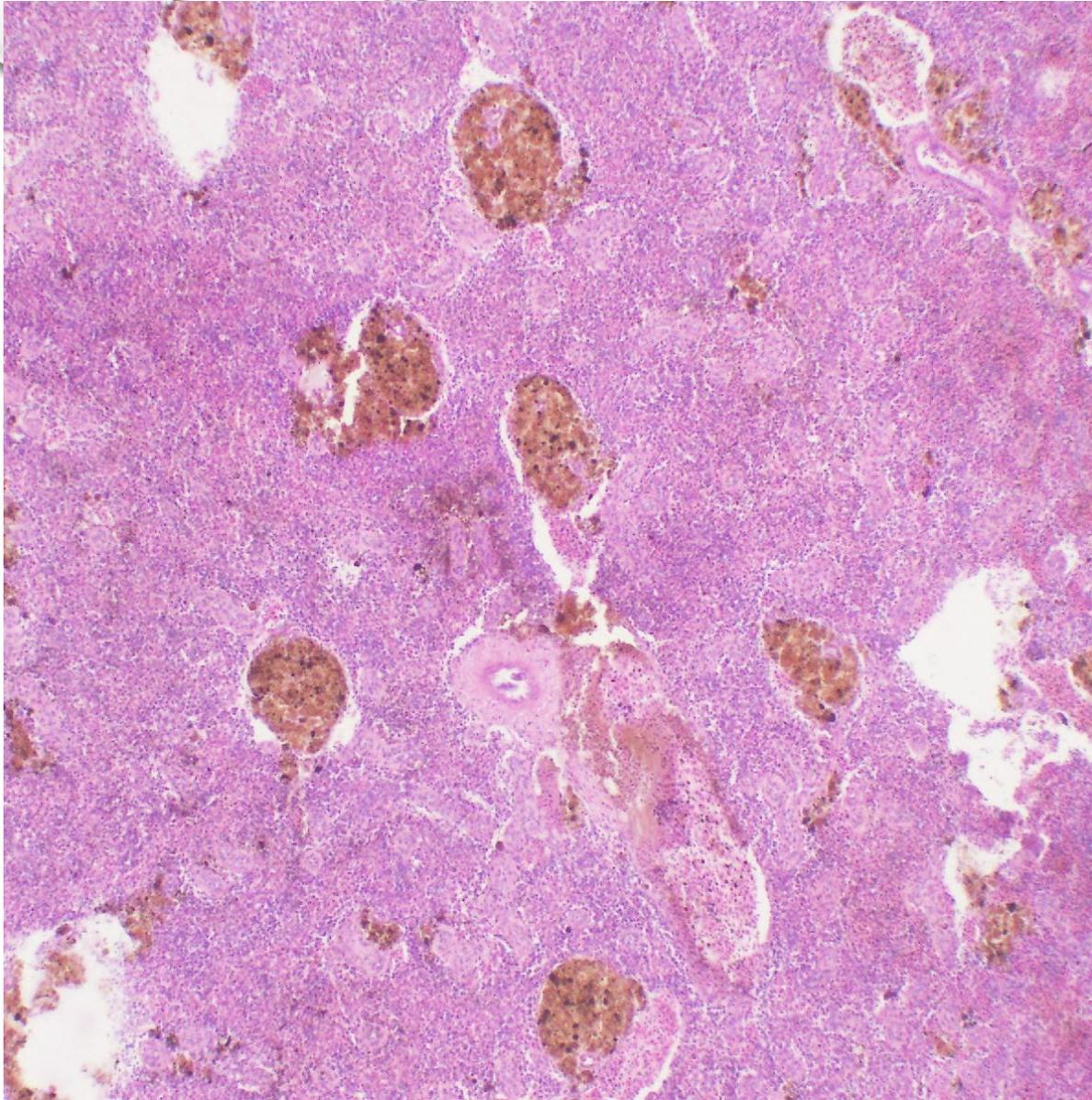
TILAPIA LAKE VIRUS DISEASE STRATEGY MANUAL

TiLV, infecta el hígado, bazo, riñones, corazón, branquias, cerebro, tejidos conectivos de los músculos y órganos reproductivos de la tilapia (Tang et al. 2021)





- ❖ Actualmente, no existen protocolos o medicamentos efectivos para reducir el impacto de un brote de TiLV.
- ❖ Selección de reproductores resistentes a TiLV y desarrollo de vacunas y protocolos de bioseguridad apropiados pueden ofrecer una solución de gestión de la salud a largo plazo (Ferguson et al. Alabama. 2014).
- ❖ Si se confirma TiLV en un sitio o granja en particular, es recomendable despoblar la instalación y realizar una desinfección a fondo según lo especificado por OIE.





STERILITY GUARANTEED IF PACKET IS UNBROKEN

Surgical Blade

CE 0197

STERILE R

STERILE SINGLE-USE CARBON STEEL

Sterilized by GAMMA radiation 25KGY

STERILITY GUARANTEED IF PACKET IS UNBROKEN

NEEDLE

OPEN

OPEN



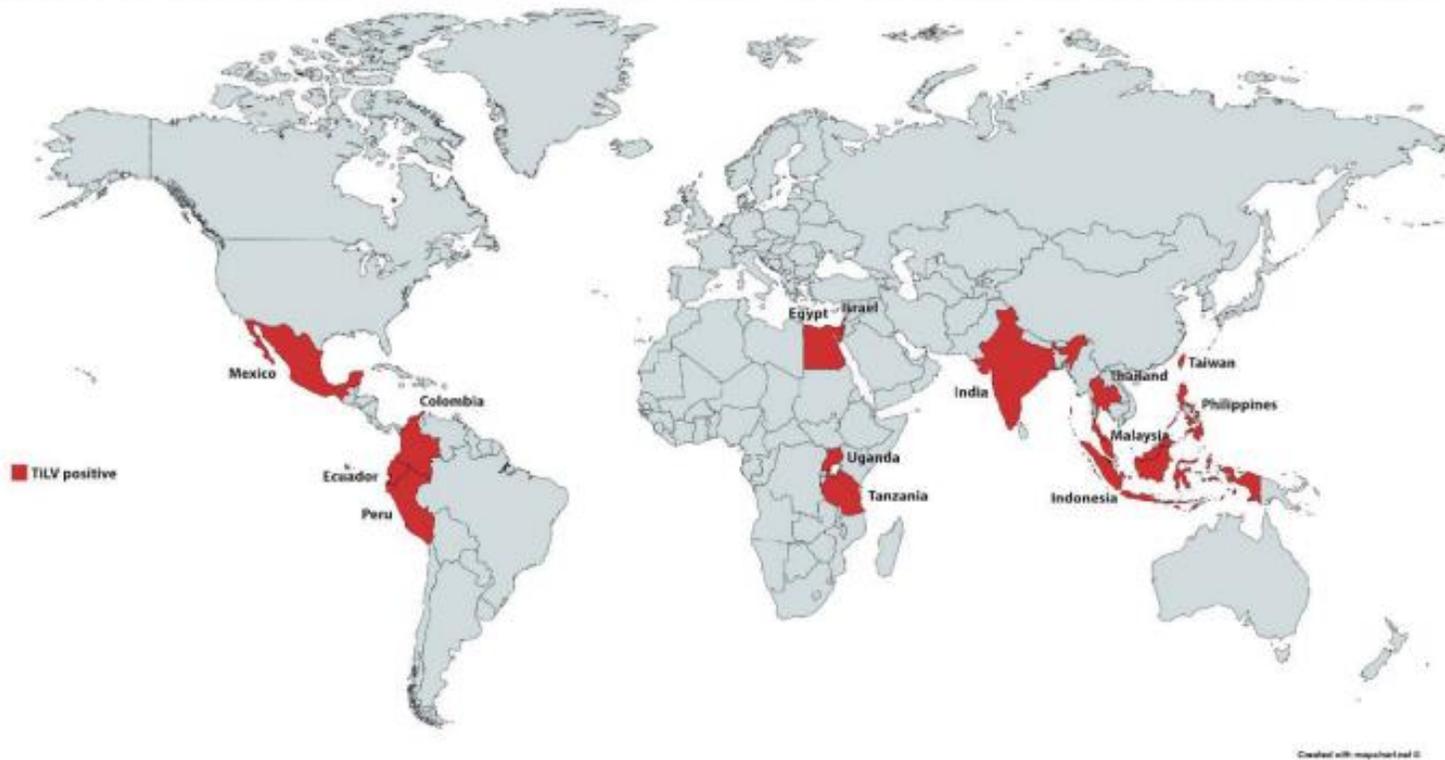
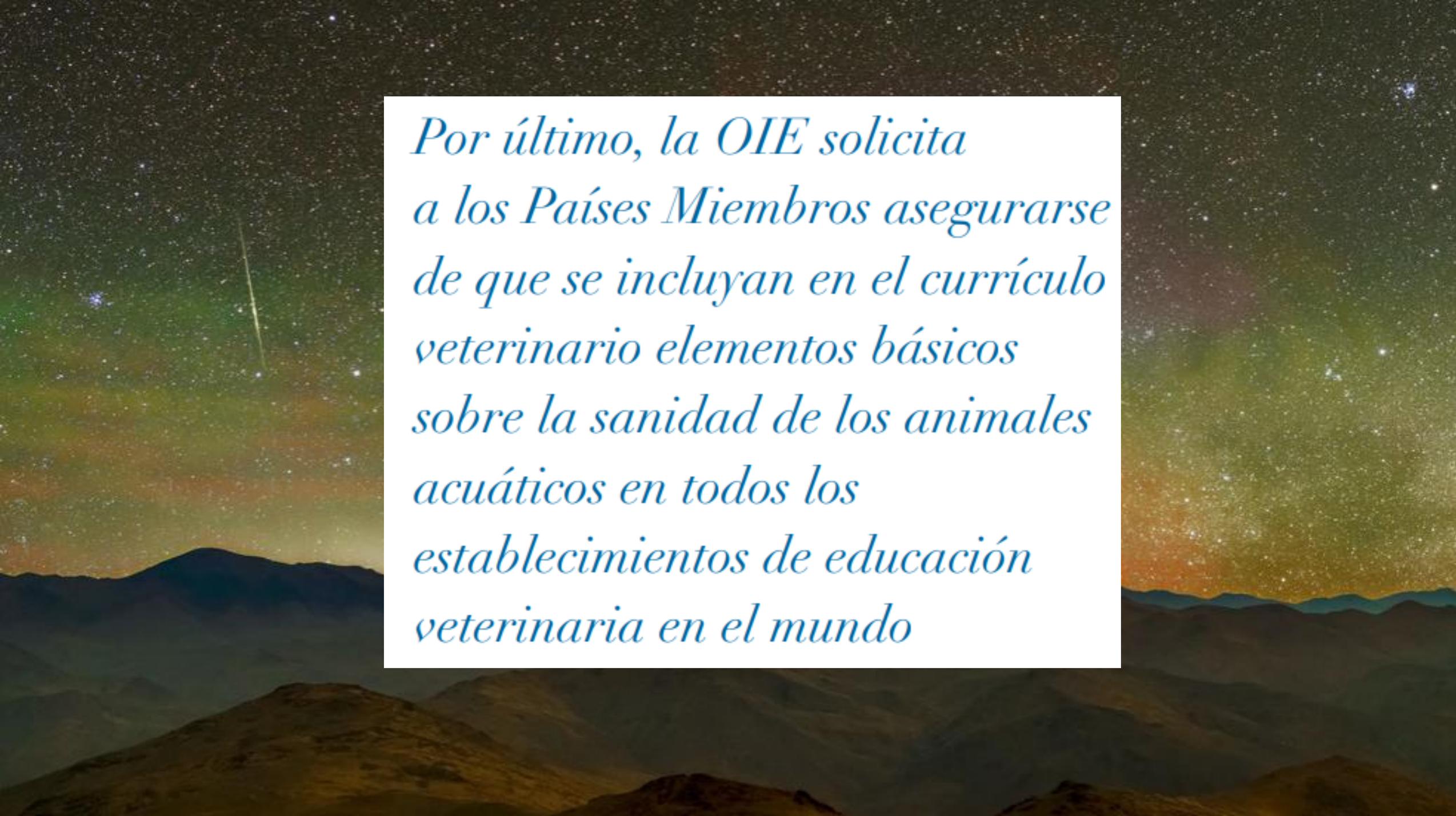


Figure 1. The geographical distribution of tilapia lake virus (TiLV) detected in tilapia and hybrid species. Countries indicated in red are regions with reported TiLV cases and the information was gathered from scientific publications or official reports to OIE-World Organisation for Animal Health.

Credits: <https://mapchart.net>



Por último, la OIE solicita a los Países Miembros asegurarse de que se incluyan en el currículo veterinario elementos básicos sobre la sanidad de los animales acuáticos en todos los establecimientos de educación veterinaria en el mundo

