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IMPROVING AQUACULTURE BIOSECURITY IN OGUN AND DELTA STATES: THE STATUS ON CIRCULATING PATHOGENS

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OUTLINE

- Introduction
- Method
- Results
- Discussion
- Conclusion
- Recommendation

INTRODUCTION

- In the last two decades, Nigeria has seen a boost in the growth and development of its aquaculture sector
- It has been reported as one of the Africa's largest producers of farmed fish *(WorldFish, 2018)*
- However, Nigerian aquaculture industry is not devoid of challenges which might limit the sustainable growth of the sector
- Intensive fish culture precipitates stress from overcrowding, poor water quality, etc.

INTRODUCTION

- The resultant effect is disease-related production losses and suboptimal yields at farm level.
- The ability to curtail, contain and eradicate diseases of fish when they occur will depend on several factors bordering on biosecurity measures
- The aspect of our study being presented is geared towards identifying pathogens of socio-economic significance circulating in the Nigerian catfish and tilapia aquaculture

METHOD

- Five and three consenting fish farm clusters were recruited into the study respectively in Delta (Ughelli North, Ika South, Isoko/Warri, Uvwie and Oshimili South) and Ogun (Eriwe, Ilase and Ikenne) States

- Field sample collectors were trained to collect screening tissue samples (Liver, Kidney and Spleen) seasonally from apparently healthy or moribund fish

- Resident Veterinarians visited farm clusters monthly and during disease outbreaks to collect tissue samples from moribund and/or apparently sick fish

METHOD

- Selective Media were used for bacterial culture, isolation and biochemical tests to identify pathogen

- All these were carried out in the Fish and Wildlife Disease Laboratory, Department of Veterinary Public health and Preventive Medicine, University of Ibadan according to standard bacteriological standards

- Results based on reactions to the biochemical tests were documented

SAMPLE INNOCULATION AND CULTURE

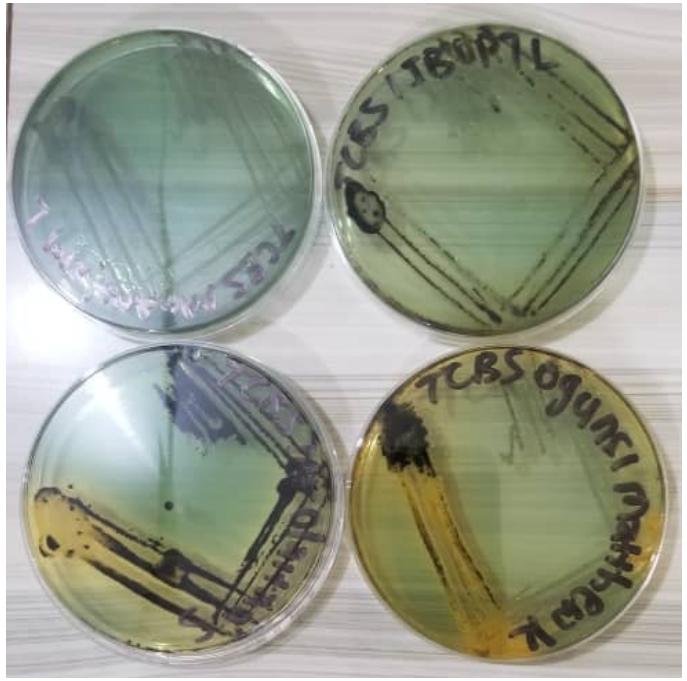
Media for bacterial isolation were prepared according to manufacturer's instructions and used as follows:

Selective Media	Bacterial Isolates
Trypticase Soy Agar (Granucult ™, Germany)	*Flavobacterium* species
Salmonella-Shigella Agar (Millipore®, Germany) and Brain-Heart Infusion Agar (Millipore®, Germany)	*Edwardsiella* species
Trypticase Soy Agar (Granucult™, Germany) supplemented with 1% Sodium Chloride (NaCl)	*Lactococcus garvieae*.

Selective Media	Bacterial Isolates
Brain-Heart Infusion Agar (Millipore ®, Germany) supplemented with 1.5% Sodium Chloride	*Streptococcus iniae*
Thiosuifate Citrate-Bilesalts Sucrose Agar (Millipore®, Germany)	*Vibrio* species
Pseudomonas Cetrimide Agar (Oxoid)	*Pseudomonas* species
Aeromonas Selective Agar (BSIBG Agar, HIMEDIA®)	*Aeromonas* species
MacConkey Agar (Merck KGaA, Germany),	Enterobacteriaceae species and *Shewanella putrefaciens*
Trypticase Soy Agar (Granucult ™, Germany) supplemented with glycerol	*Acinetobacter* species

RESULTS: BACTERIAL ISOLATES GROWTH

Klebsiella spp

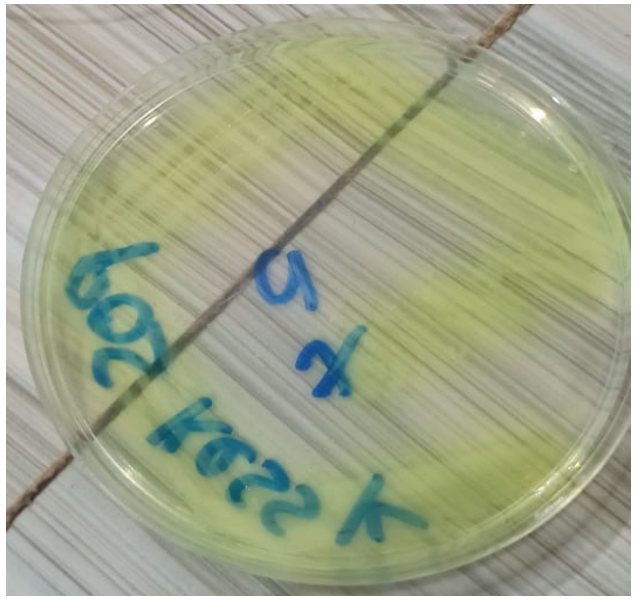


Vibrio spp

BACTERIAL ISOLATES GROWTH

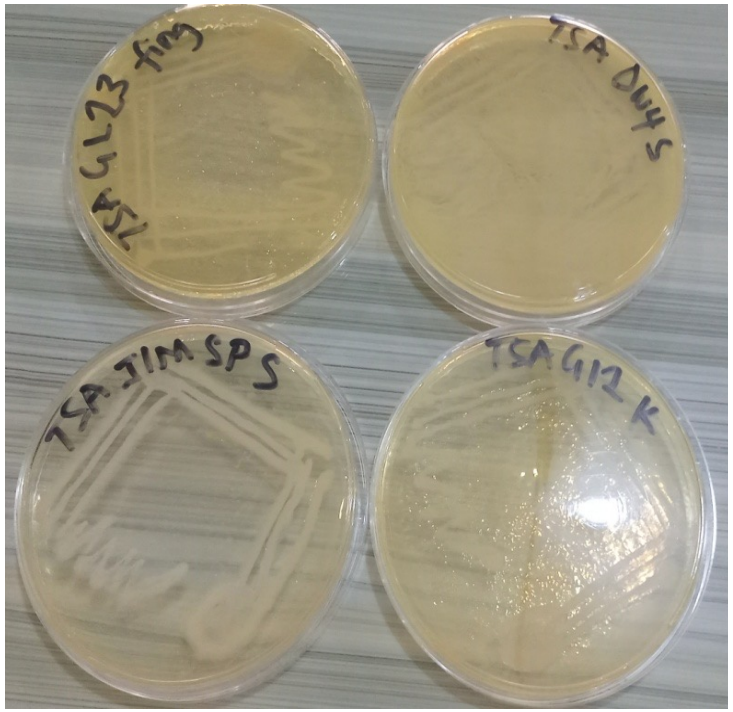
Lactococcus spp

Acinetobacter spp



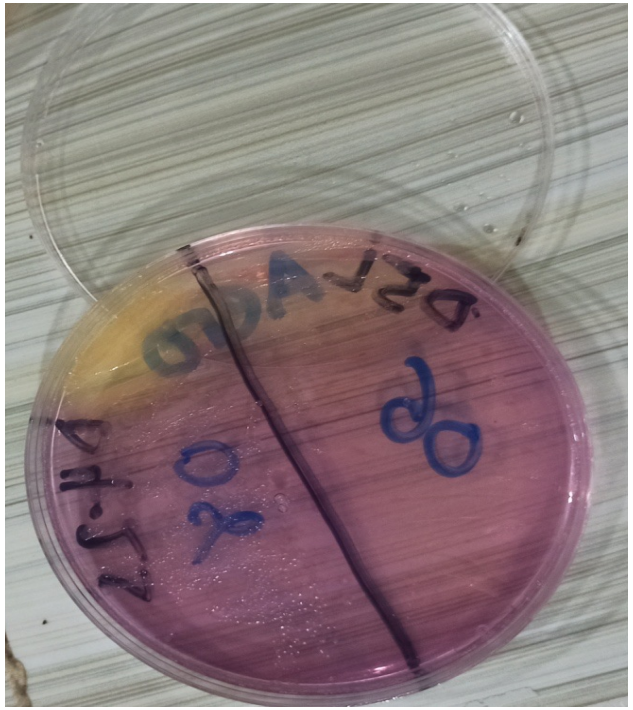
Pseudomonas spp

BACTERIAL ISOLATES GROWTH



Flavobacterium spp

Streptococcus spp

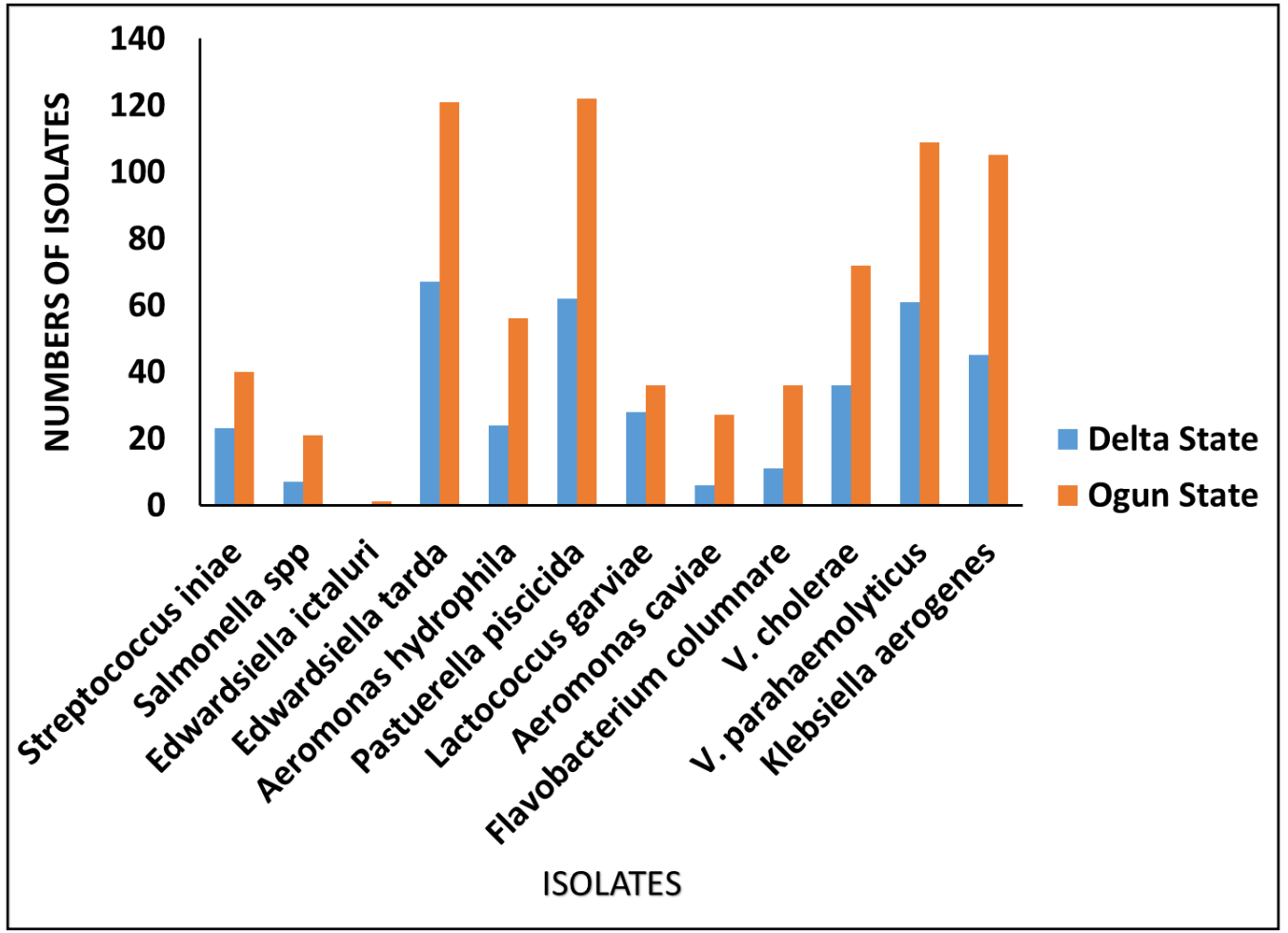


Aeromonas spp

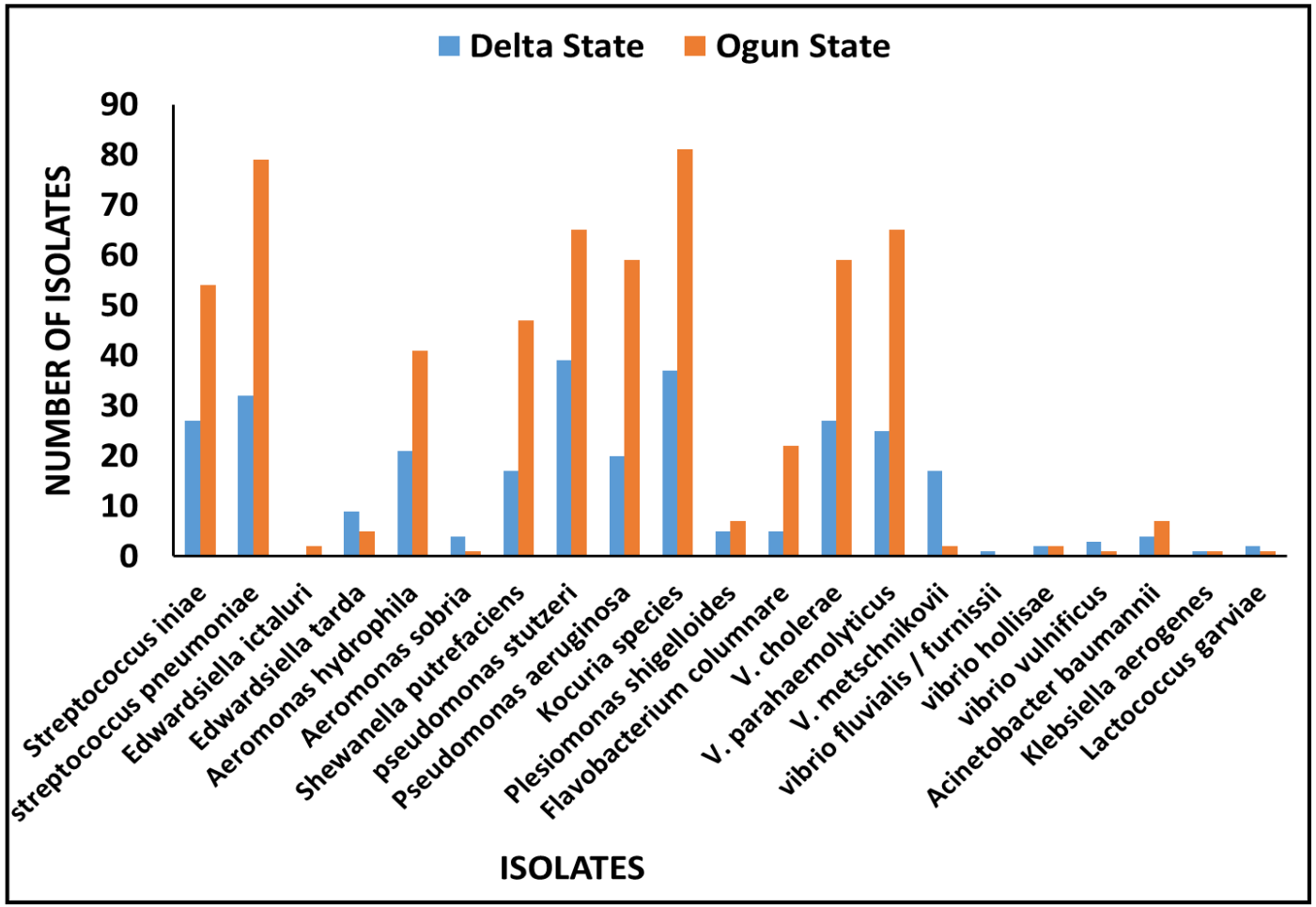
RESULTS

- A total of 370 and 746 isolates were recorded in Delta and Ogun States, respectively during the rainy season.
- While during the dry season, 298 and 601 isolates were recorded in Delta and Ogun States, respectively.
- The isolates comprised 3 Gram positive organisms and 11 Gram negative organisms

RAINY SEASON OUTLOOK



DRY SEASON OUTLOOK



- In all, 3 gram positive and 11 gram-positive bacterial organisms were identified

Gram +ve Organisms	%	
Lactococcus garvieae	3.32	1
Streptococcus iniae	7.13	
streptococcus pneumoniae	5.50	2
Kocuria species	5.84	3

Gram -ve Organisms	%	
Edwardsiella ictaluri	0.15	1
Edwardsiella tarda	10.00	
Aeromonas hydrophila	7.03	
Aeromonas sobria	0.45	
Aeromonas veronii	0.05	
Aeromonas caviae	1.63	2
Shewanella putrefaciens	3.17	3
pseudomonas stutzeri	5.15	
Pseudomonas aeruginosa	3.91	4
V. cholerae	9.60	
V. parahaemolyticus	12.87	
V. metschnikovii	0.94	
vibrio fluvialis / furnissii	0.05	
vibrio hollisae	0.20	
vibrio vulnificus	0.20	5
Plesiomonas shigelloides	0.59	6
Flavobacterium columnare	3.66	7
Klebsiella aerogenes	7.52	8
Acinetobacter baumannii	0.54	9
Salmonella spp	1.39	10
Pastuerella piscicida	9.11	11

During Rainy season, 12 categories of isolates were recorded and listed. However, *E ictaluri* was not found in Delta States during rainy seasons while *Salmonella, A. caviae and Pastuerella piscicida* were only found during rainy season in both States

Rainy season Isolates
Streptococcus iniae
Salmonella spp
Edwardsiella ictaluri
Edwardsiella tarda
Aeromonas hydrophila
Pastuerella piscicida
Lactococcus garviae
Aeromonas caviae
Flavobacterium columnare
V. cholerae
V. parahaemolyticus
Klebsiella aerogenes

During dry season, 20 isolates were recorded and listed, However, *E ictaluri* was also not found in Delta States during dry season

	Dry season sampling
s/n	
1	*Streptococcus iniae*
2	*streptococcus pneumoniae*
3	*Edwardsiella ictaluri*
4	*Edwardsiella tarda*
5	*Aeromonas hydrophila*
6	*Aeromonas sobria*
7	*Shewanella putrefaciens*
8	*pseudomonas stutzeri*
9	*Pseudomonas aeruginosa*
10	*Kocuria species*
11	*Plesiomonas shigelloides*
12	*Flavobacterium columnare*
13	*V. cholerae*
14	*V. parahaemolyticus*
15	*V. metschnikovii*
16	*vibrio hollisae*
17	*vibrio vulnificus*
18	*Acinetobacter baumannii*
19	*Klebsiella aerogenes*
20	*Lactococcus garviae*

DISCUSSION

- The results provides a detailed information on the circulating bacterial pathogens during rainy and dry seasons

- Bacterial diseases can lower fish yield, leading to serious economic loss and also cause dangers to the health of consumers thus, it is of great public health significance

- Some of the isolated bacteria can survive for a long time in the aquatic environment posing a great difficulty in prevention and treatment of fish diseases

DISCUSSION

- The isolation of *Vibrio cholerae* and Salmonella spp. from Ogun and Delta State's aquaculture industry portends human health risks

- The isolation of enteric bacteria in aquaculture serves as indicator organisms of faecal contamination

- Bacterial pathogens associated with fish can be transmitted to human beings from the fish used as food or by handling the fish

RECOMMENDATIONS

- Farmers should be well trained to recognize early signs to avoid disease outbreaks

- Our findings is very important for developing preventive biosecurity measures and control strategies in reducing disease outbreaks in Nigerian aquaculture

- The practice of livestock-fish farming needs to be placed in perspective with the likely health risks to humans

RECOMMENDATIONS

- Stringent regulations and monitoring activities coupled with food safety training of farmers, suppliers and ultimately the consumers on various aspects of Good Hygiene Practice (GHP), Good Manufacturing Practice (GMP) and HACCP is strongly recommended

SURVEY ABOUT NATIONAL AQUATIC ANIMAL HEALTH STRATEGY

- As included in your brief, kindly take time to fill the survey through the following link: https://forms.gle/857ni1Fy2hHuVrKW7

- The link will also be shared through email.

- Thank you.

ACKNOWLEDGEMENT

- USAID/FIL-ME
- University of Ibadan, Ibadan
- Fish Farmers in Delta and Ogun States
- Other Stakeholders in the Aquaculture value chain

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Thank You

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