Produção Exitosa de Camarão no modo Intensivo Utilizando Berçários Primários, Raceways e Viveiros de Engorda

Alexander M. de Beausset

Introducción

Guatemala y su industria de cultivo de camarón, ha sufrido la mayoría de problemas que han sufrido los cultivadores en este hemisférico;

- 1990 – IHHNV
- 1994 – TSV
- 1997 – NHP
- 2002 – WSSV
- 2008 – ESTREPTOCOCOS
- 2005 > Presente – Vibriosis

Estamos pendiente todavía de:

YHV

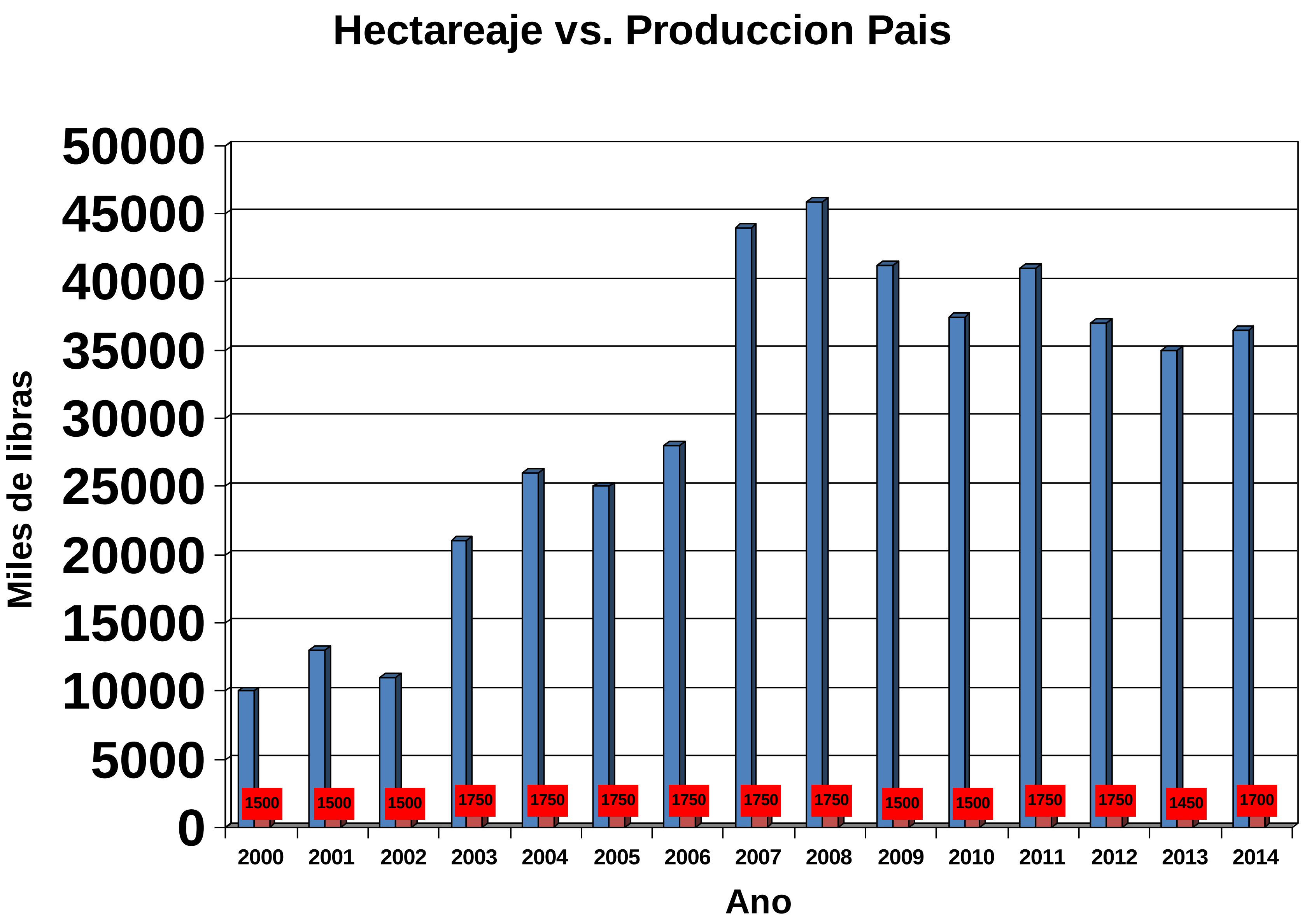
IMNV

EHP (Enterocytozoon Hepatopenaei Parasite)

???????

Además hemos sufrido frecuentes inundaciones, erupciones, terremotos, y precios constantemente a la baja. A pesar de esto Guatemala sigue produciendo entre 35 millones a 46 millones de libras en solo 1400-1750 hectáreas, el cual lo clasifica como uno de los países mas productivos por área del mundo.

Lo siguiente es un pequeño análisis de los sistemas que han utilizado en Guatemala y como han ido desarrollando, los cuales podrían alumbrar las razones del continuo éxito de la industria en general.


Hectareaje vs. Produccion Pais
Miles de libras
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1500
1500
1500
1750
1750
1750
1750
1750
1750
1500
1500
1750
1750
1450
1700
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Ano


MEXICO
BELIZE
HONDURAS
Guatemala

RETOS GUATEMALTECOS

1984 – POCOS AREAS CON ACCESO A AGUA SALADA, ARENOSOS, Y COSTOSOS

- SOLUCION:

Producir mucho en las pocas áreas que había (subir densidad) para sostener la cadena productiva utilizando el abundante recurso natural.

1990 - IHHNV

- SOLUCION: Fue descubierto en la semilla silvestre, pero nunca se manifestó en cultivo. Había Resistencia natural o era cepas no dañinas en nuestro hábitat. La industria solo monitoreaba la incidencia.

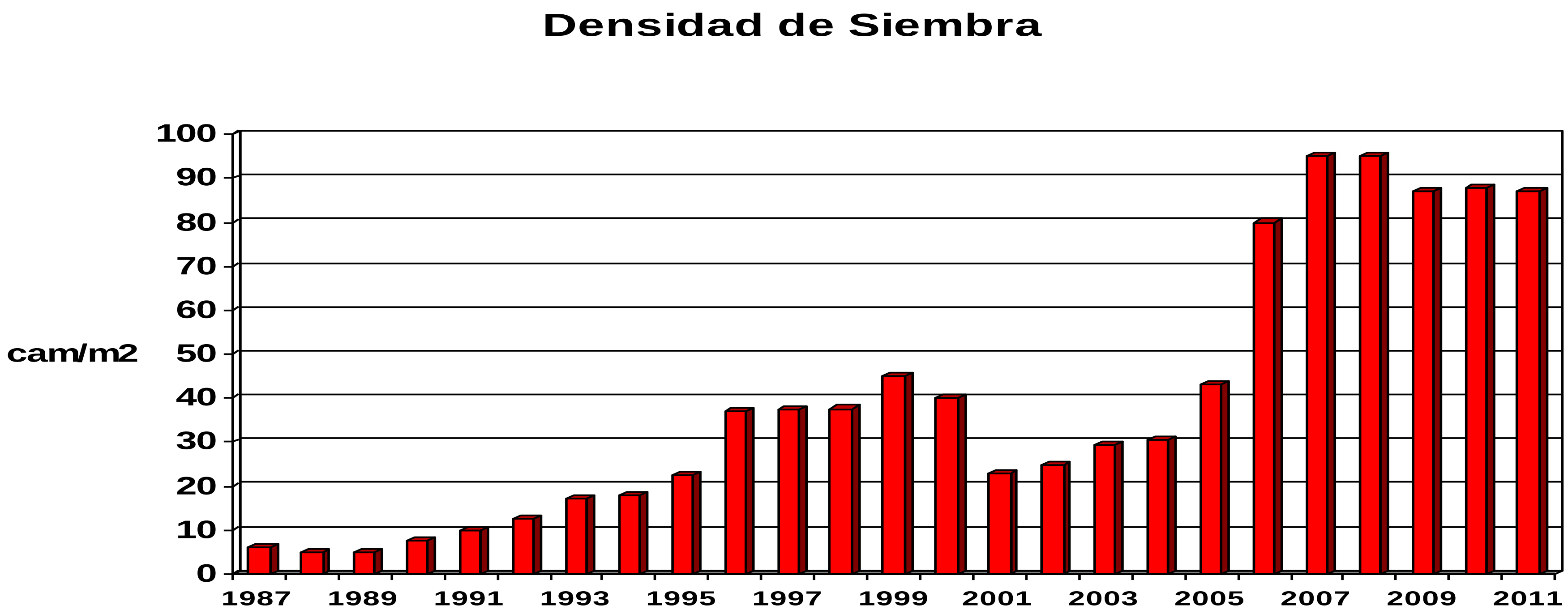
1995 – TSV. SUPERVIVENCIAS BAJARON AL 25%

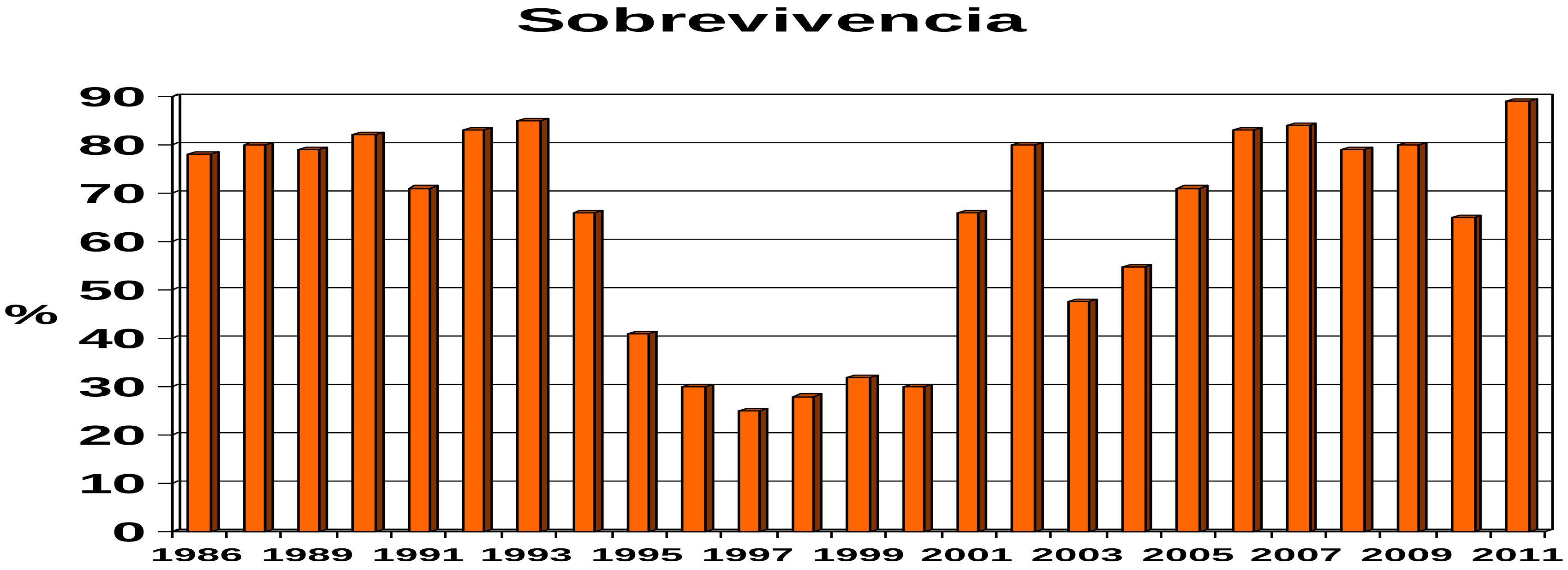
SOLUCION "A"

Se utilizo el recurso abundante de semilla silvestre para subir densidades para cubrir las mortalidades.

SOLUCION "B"

Invertimos en laboratorios para cerrar el ciclo de vida y abarcar en programas de genetica para lograr Resistencia.


Densidad de Siembra
cam/m2
100
90
80
70
60
50
40
30
20
10
0
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011


Sobrevivencia
%
90
80
70
60
50
40
30
20
10
0
1986
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011

NHP 1997

SOLUCION:

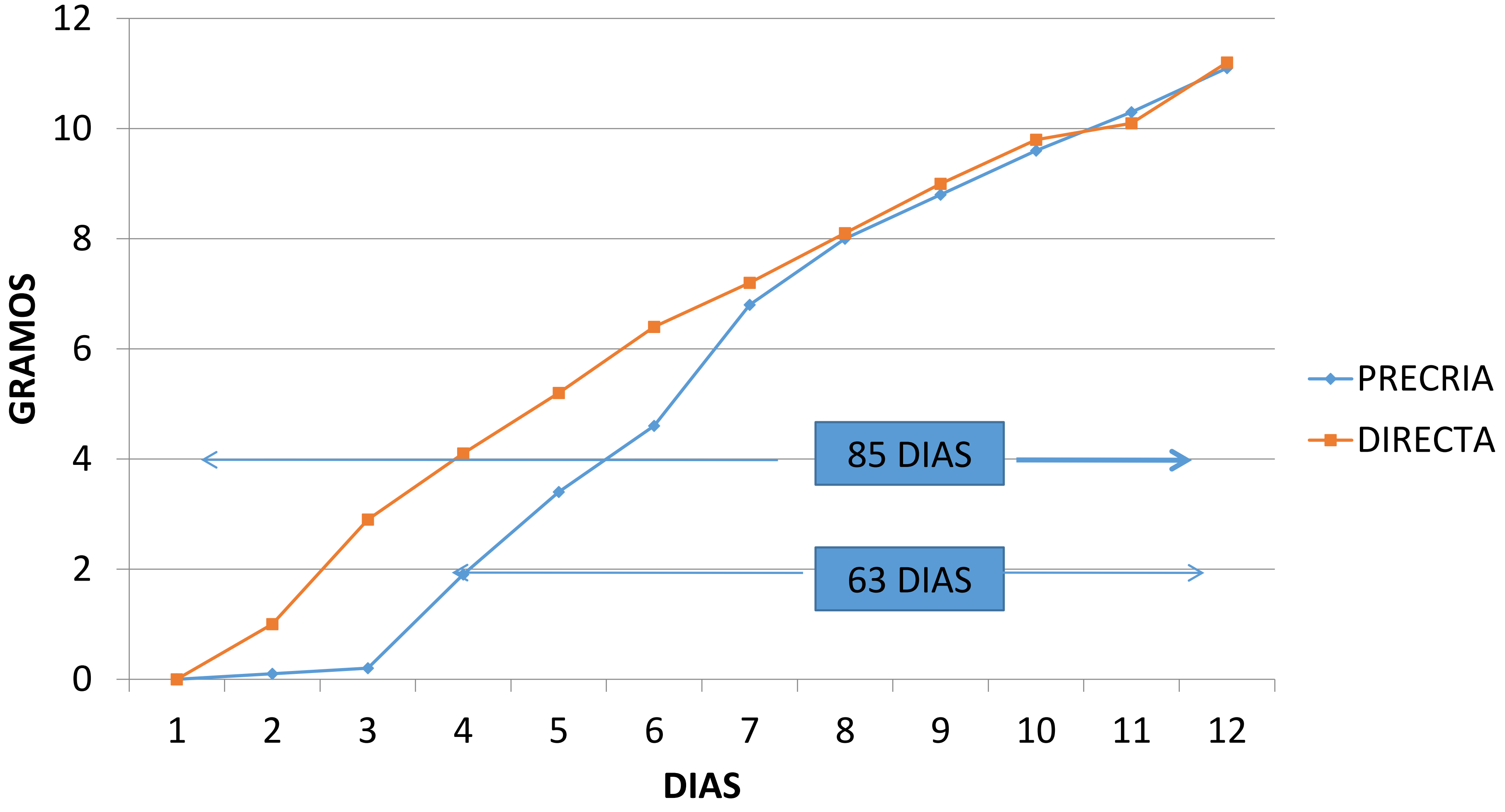
Las camaroneras migraron su bombeos y expansions hacia aguas dulcres menos de 15 ppt de sal.

2002 - WSSV

SOLUCIONES:

1) Genética
2) No producir en los meses fríos y aumentar producción en los meses calientes.
3) Utilizar precria al máximo, empezando en los meses de mayor riesgo.
4) Utilizar altos crecimientos de camarón de precria y continuos siembras y cosechas para aprovechar al máximo el tiempo caloroso y de lluvias.

PRECRIA VS. SIEMBRA DIRECTA



VIBRIOSIS 1990 > PRESENTE

- SOLUCIONES:
  1) Genetica – Resistencia y alto crecimiento
  2) Salinidades bajas (5 – 15 ppt)
  3) Ciclos cortos
  4) Temperatura (piscinas profundas +2.5 mts.)
  5) Fondos limpios (plastic/probioticos/control FC/sifoneo/manejo aereacion).
  6) Pozos
  7) Tilapia

Food and Agriculture Organization of the United Nations

FAO TCP/INT/3502

"Reducing and managing the risk of Acute Hepatopancreatic Necrosis Disease (AHPND) of Cultured Shrimp"

International Technical Seminar/Workshop
"EMS/AHPND: Government, Scientist and Farmer Responses"

22-24 June 2015
Tryp Hotel, Panama City

Alday-Sanz, Victoria, Dr. Chanratchakool, Pornlerd, Dr.
Technical Manager,Aquaculture; Novozymes. Thai nationality, He served as pathologist under Aquatic Animal Health Research Institute, Royal Thai Department of Fisheries during 1986-2004.
Director of Biosecurity, NAQUA, Saudi Arabia.

Brock, James Allan, Dr.
Director, Animal Health, Moana Technologies, L.L.C. A veterinarian who has been involved with aquatic animal health since 1977 when in his senior year at Washington State University,

Chanratchakool, Pornlerd, Dr.
Technical Manager,Aquaculture; Novozymes. Thai nationality, He served as pathologist under Aquatic Animal Health Research Institute, Royal Thai Department of Fisheries during 1986-2004.

Cuèllar-Anjel, Jorge, Dr.
Biosecurity, Research and Diseases of Aquatic Organisms.

Flegel, Tim, Prof. Dr.
Tim Flegel is currently located at the Center of Excellence for Shrimp Molecular Biology and Biotechnology (Centex Shrimp) that is co-operated by the Faculty of Science Mahidol University and the Thai National Center for Genetic Engineering and Biotechnology

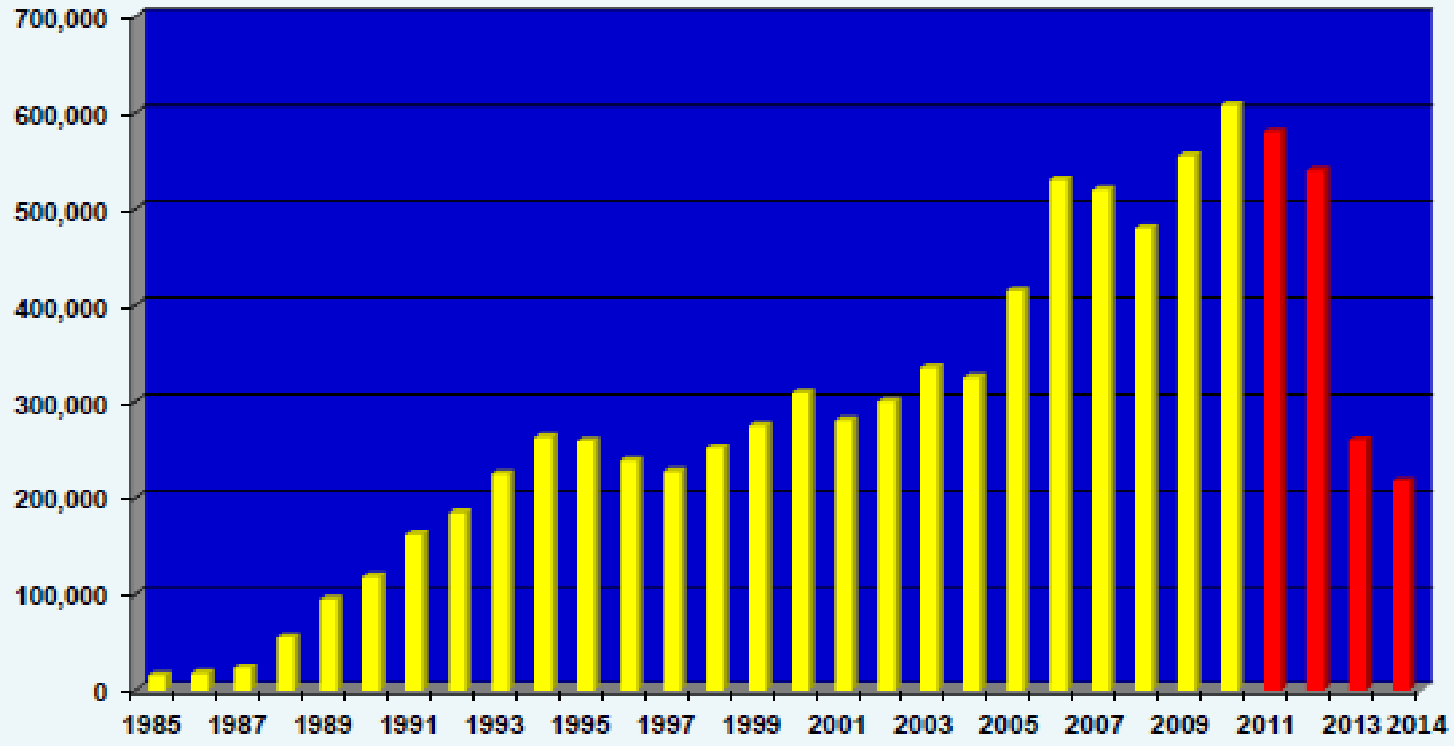
Horton, Scott Edward, M.S.
Biologist, Shrimp Aquaculturist (Biology/Development/Management). Scott Horton is a US national living in Sinaloa, Mexico.

. **Huang, Jie, Mr.**
Senior Researcher (Aquatic Animal Health). A China national, is the Chief Scientist of the Maricultural Disease Control and Molecular Pathology Laboratory

, **Massaut, Laurence, Dr.**
Laurence has a Master of Science degree in Aquatic Ecology (University of Namur, Belgium - 1990) and a Ph.D. in Aquaculture (Auburn University, USA - 1998). Laurence has more than 25 years of combined experience in water quality, aquatic ecology, phytoplankton management, aquaculture production and environmental impact assessment. Since February 1999 she is based in Ecuador

McIntosh, Robins, Mr.
Senior Vice President, Charoen Pokphand Foods, Shrimp Culture Technology. Mr McIntosh joined C.P. Foods, Ltd (CPF) in 2002 with the responsibility of revitalizing the CPF’s shrimp culture activities

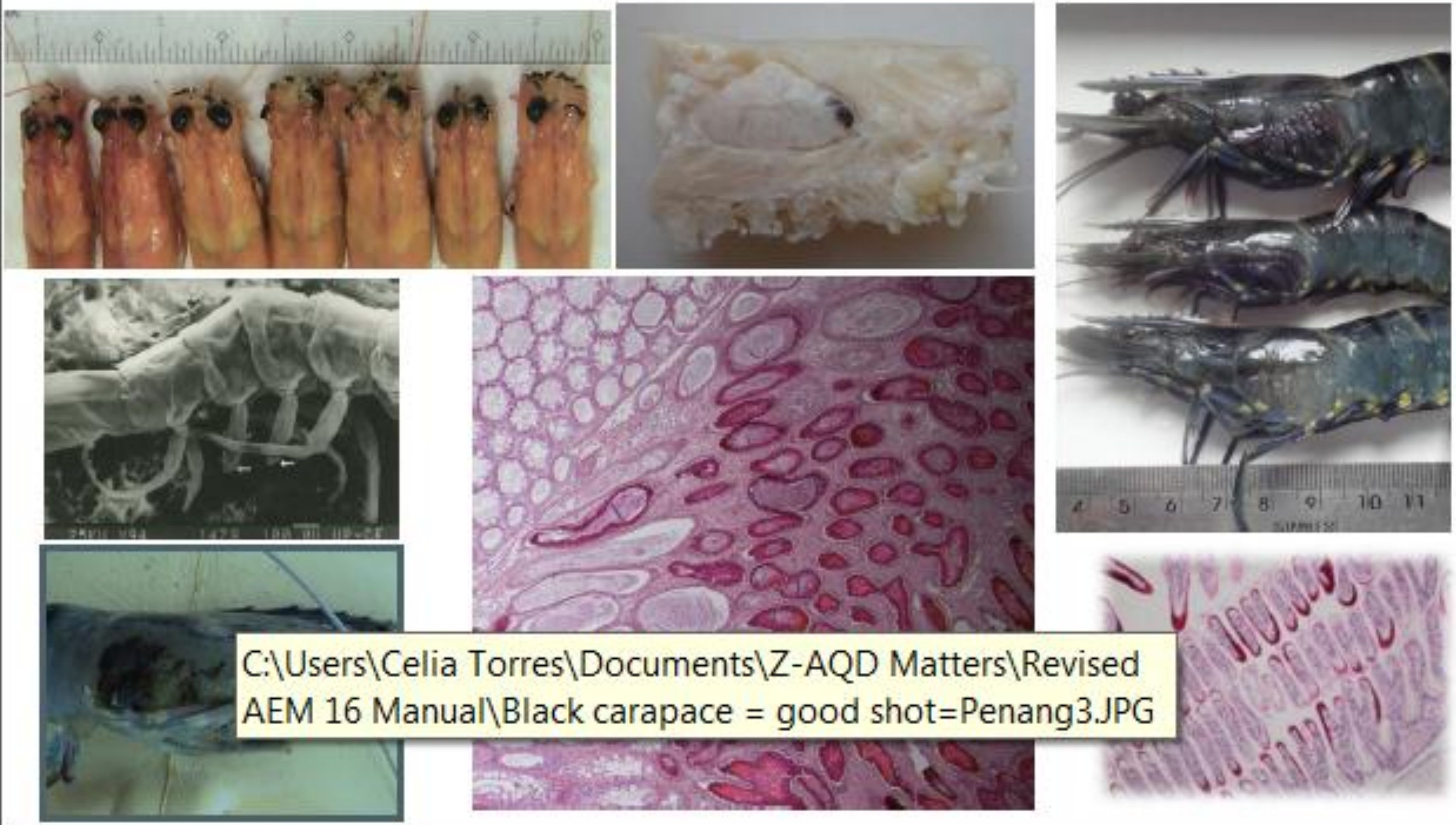
And then I learned:
Still much to learn about sustainability



Thai Shrimp Production

What is vibriosis?

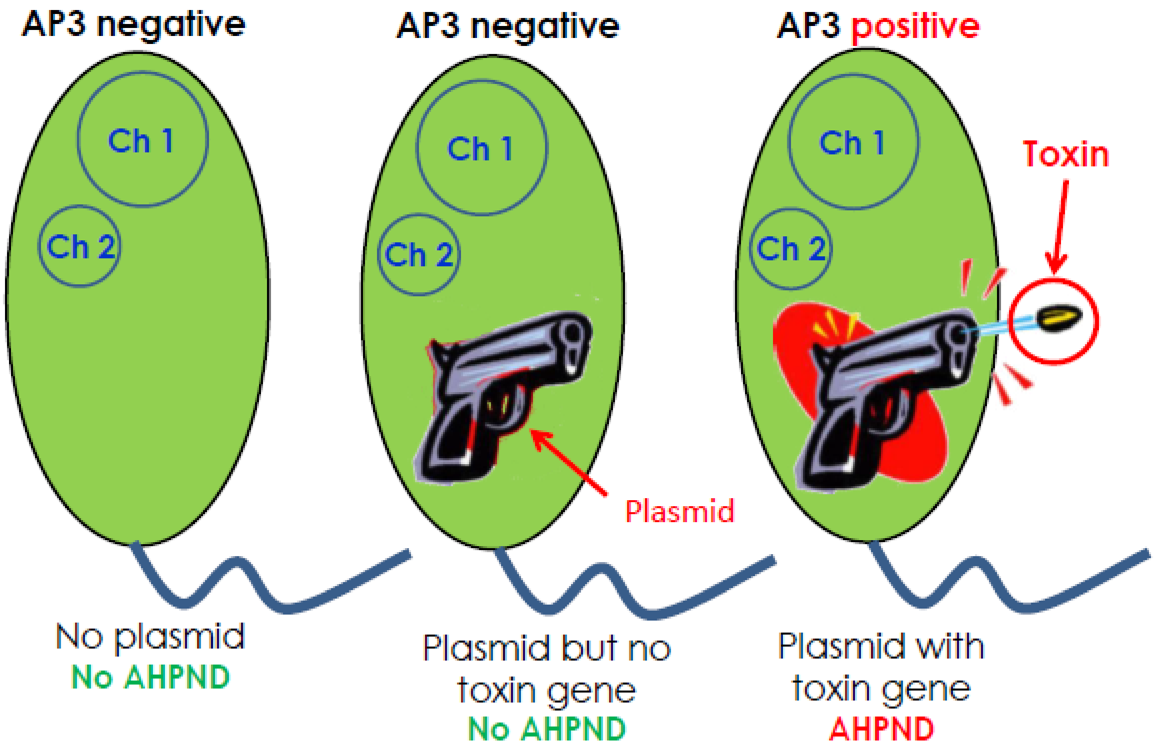
Vibriosis is a bacterial disease caused by *Vibrio* species that are **ubiquitous** in seawater environments. It affects many aquatic organisms causing lesions, discoloration, or loss of function of affected parts.



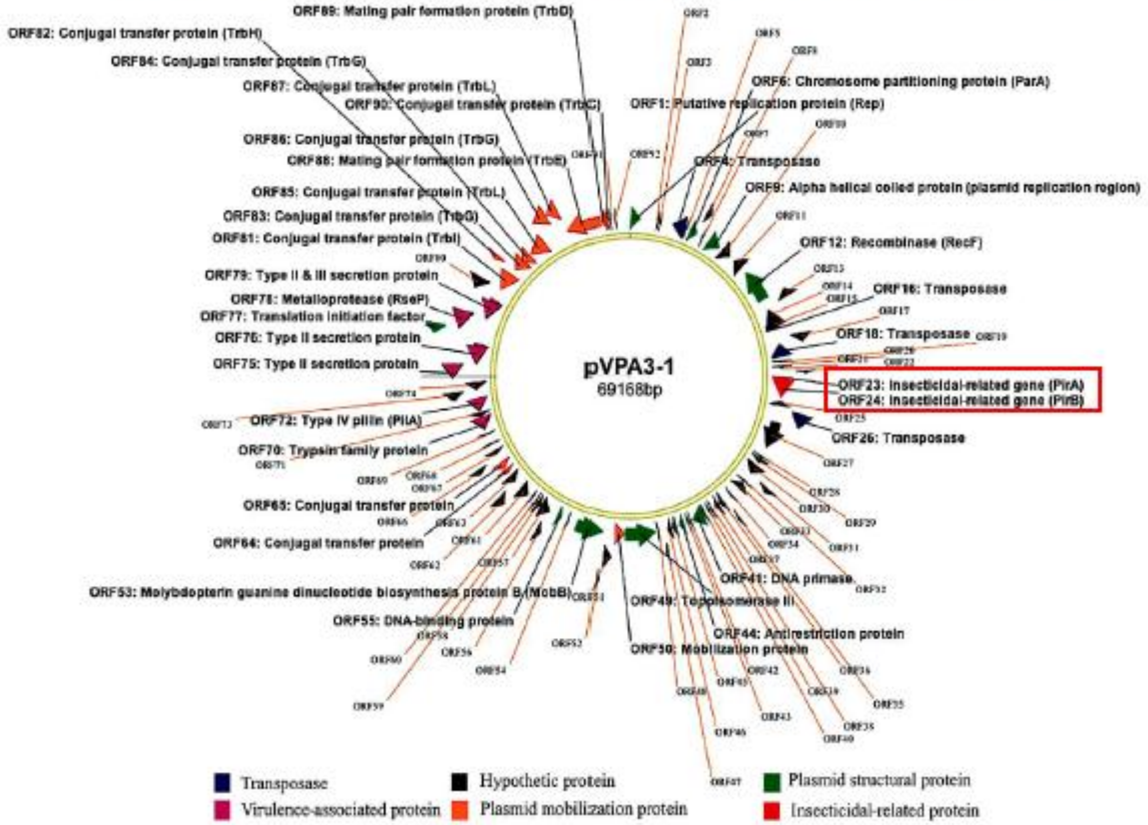
V. parahaemolyticus – occurrence and distribution

- Estuarine and coastal environments
- Global occurrence
- Associated with all types of animals in brackish water environments – zooplankton, molluscs, crustaceans, shellfish and finfish
- Ecology influenced by temperature and salinity.
- In tropical environments, detected throughout the year, provided salinity and other conditions are available.
- In temperate climate, detected mostly in summer. The organism undergoes overwintering in sediments.

AP3 detection results

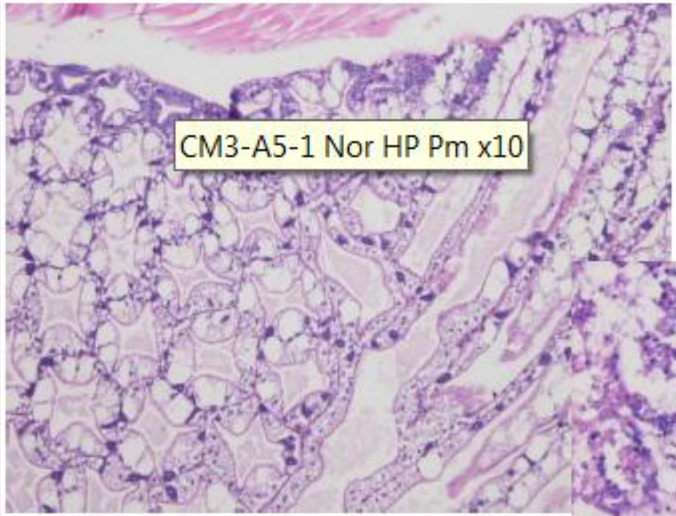


pAP3-1 Plasmid with toxin genes

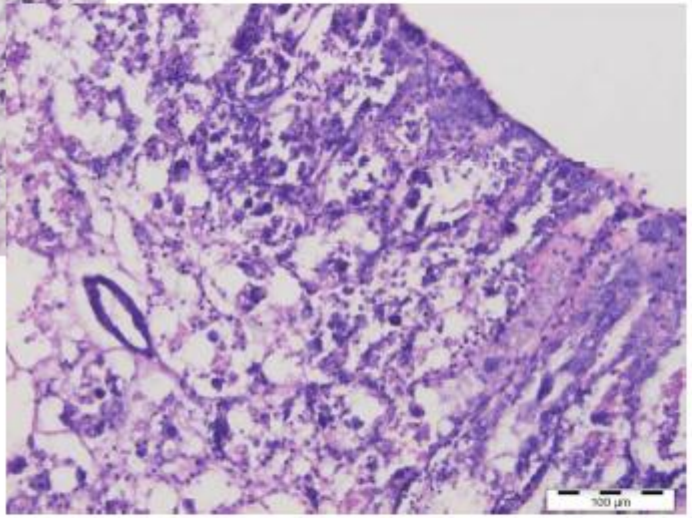


Medial sloughing of HP cells

The key diagnostic feature needed for confirmation



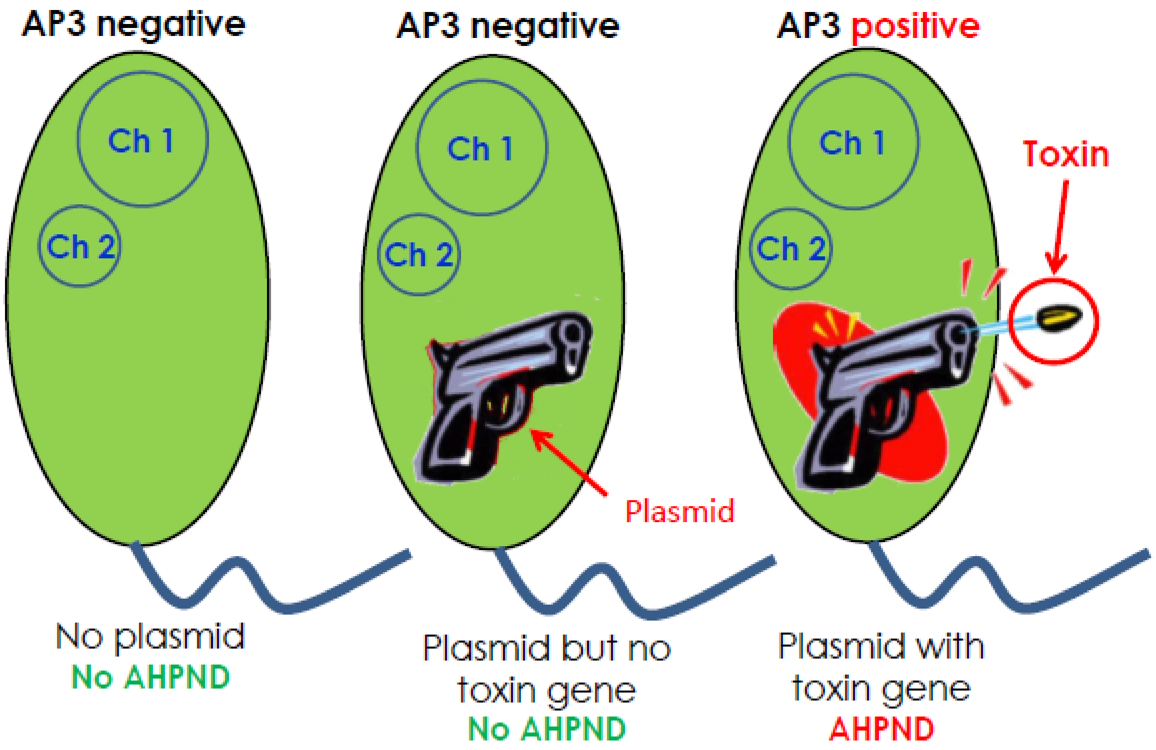
Normal hepatopancreas



AHPNS hepatopancreas

Vibriosis NO ES AHPND

AP3 detection results



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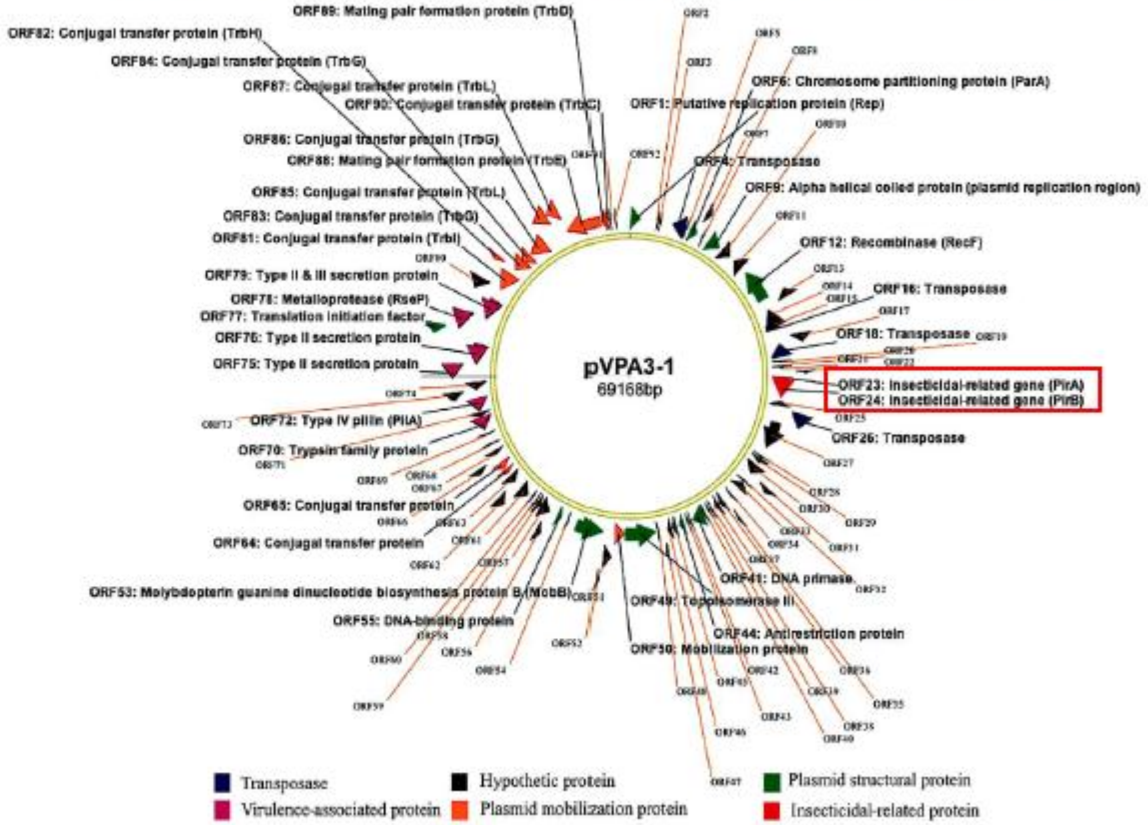

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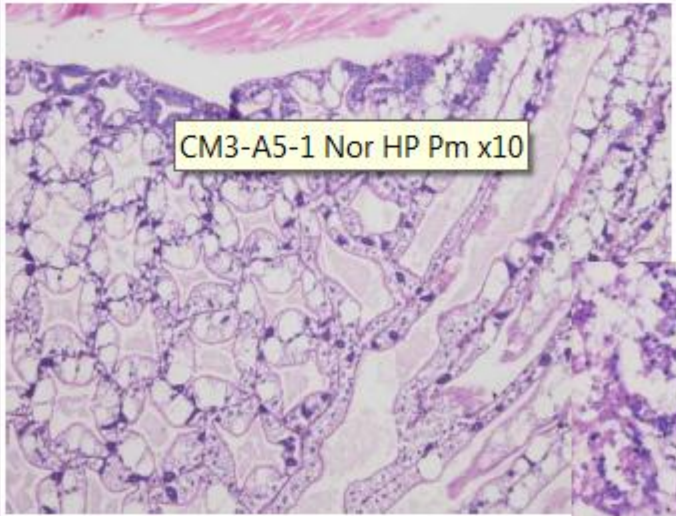
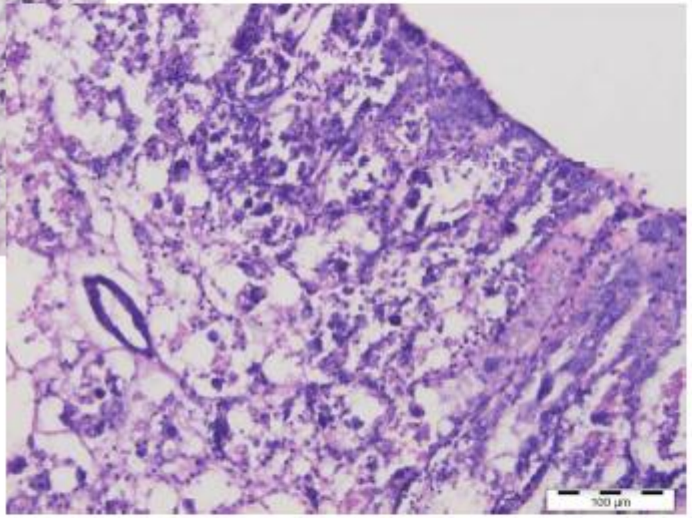


Normal hepatopancreas



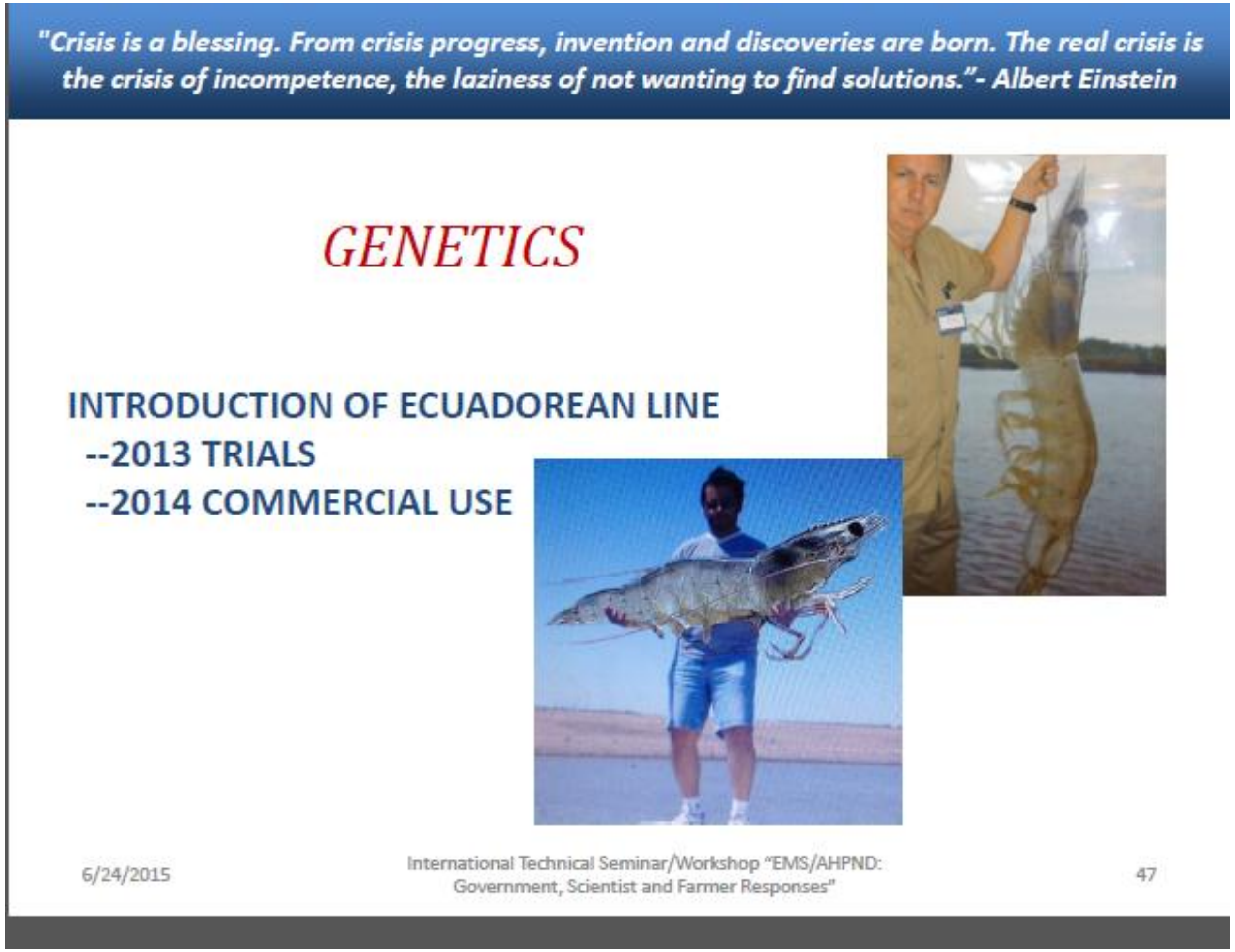
AHPNS hepatopancreas

LOS 7 HERRAMIENTAS VIBRIOSIS/AHPND

1) GENETICA

A) RESISTENCIA

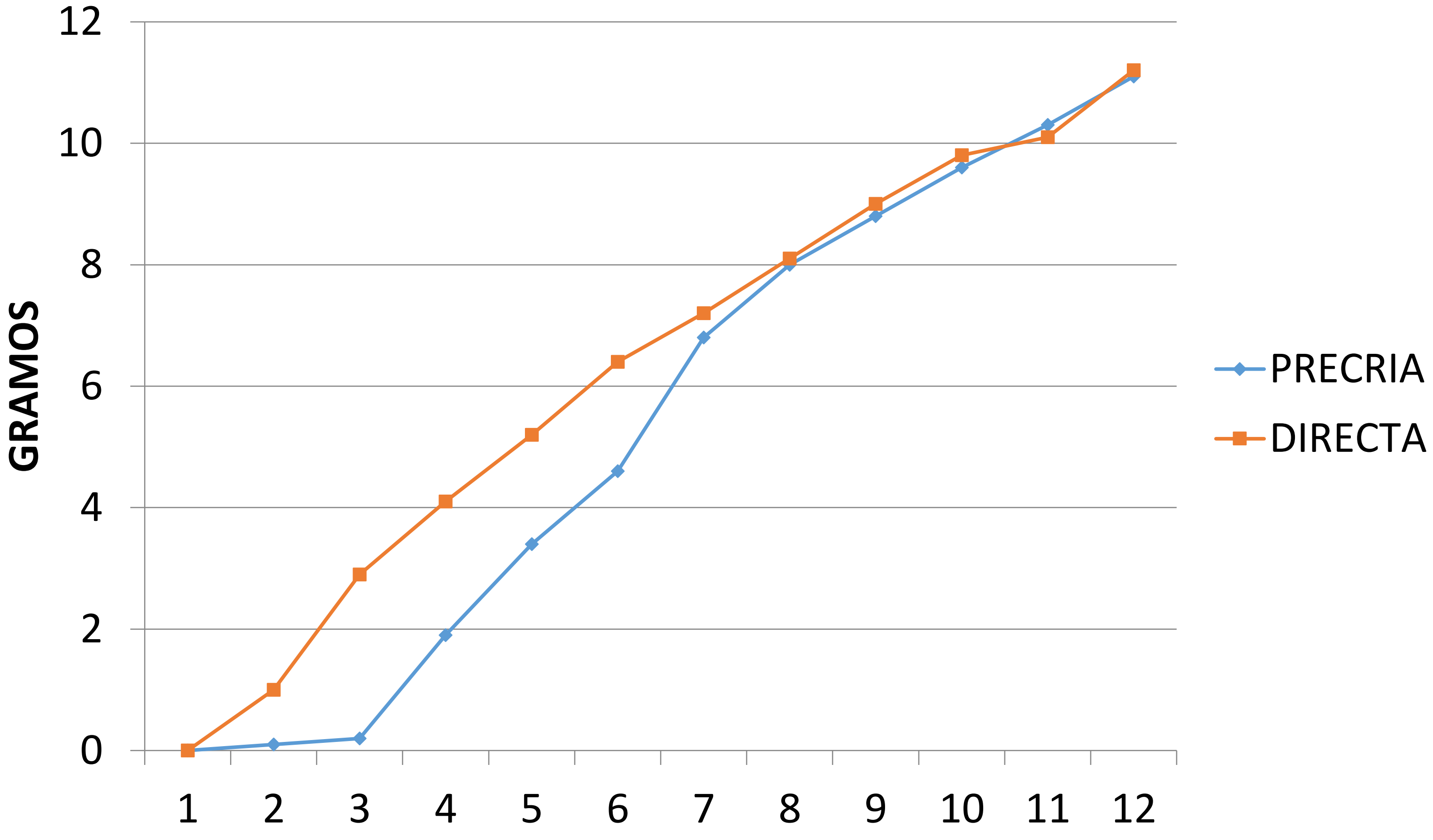
B) CRECIMIENTO (CICLOS CORTOS)



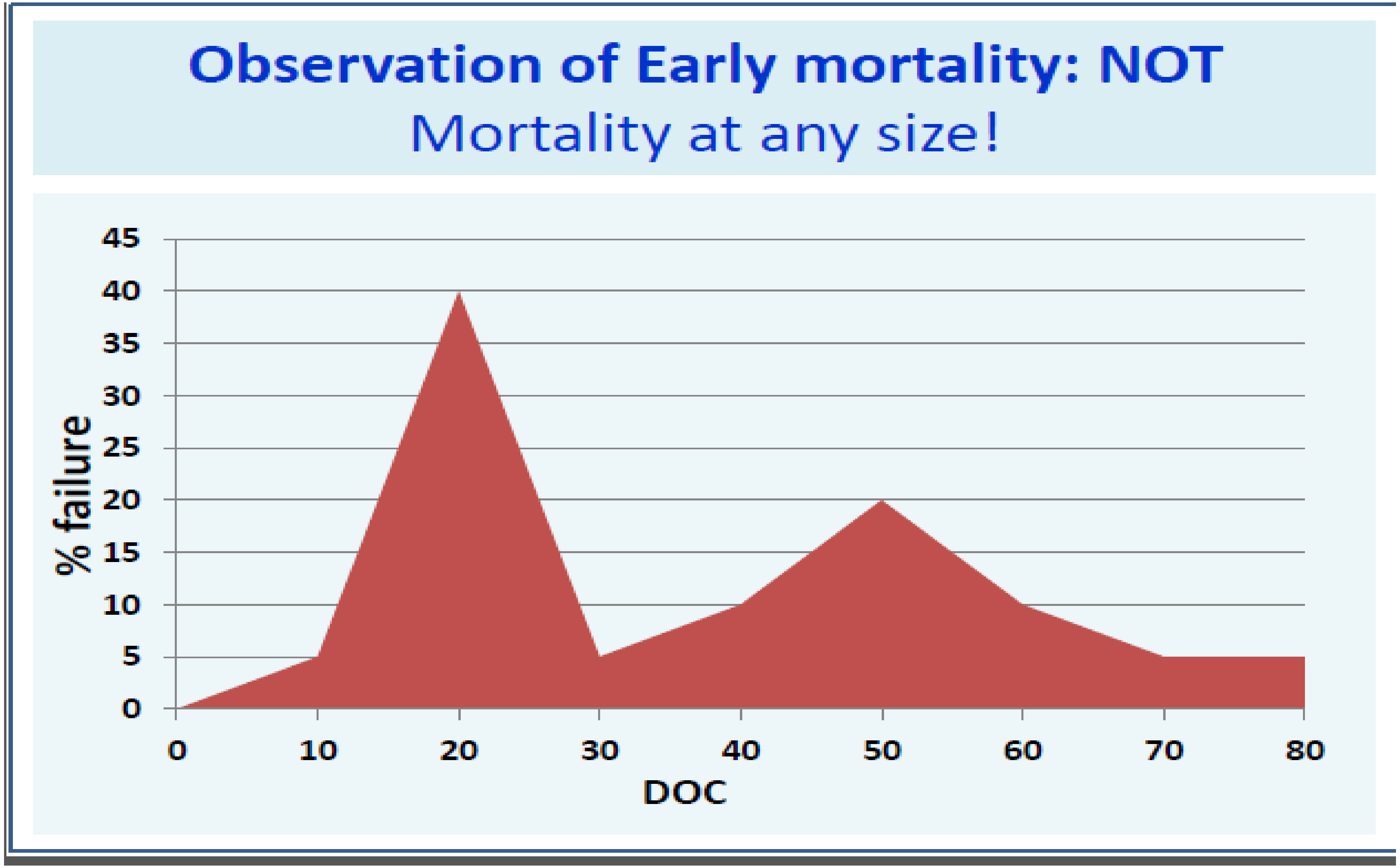
2) CICLOS CORTOS

- Uso de precria.
- Tamaño pequeño

  cosecha.

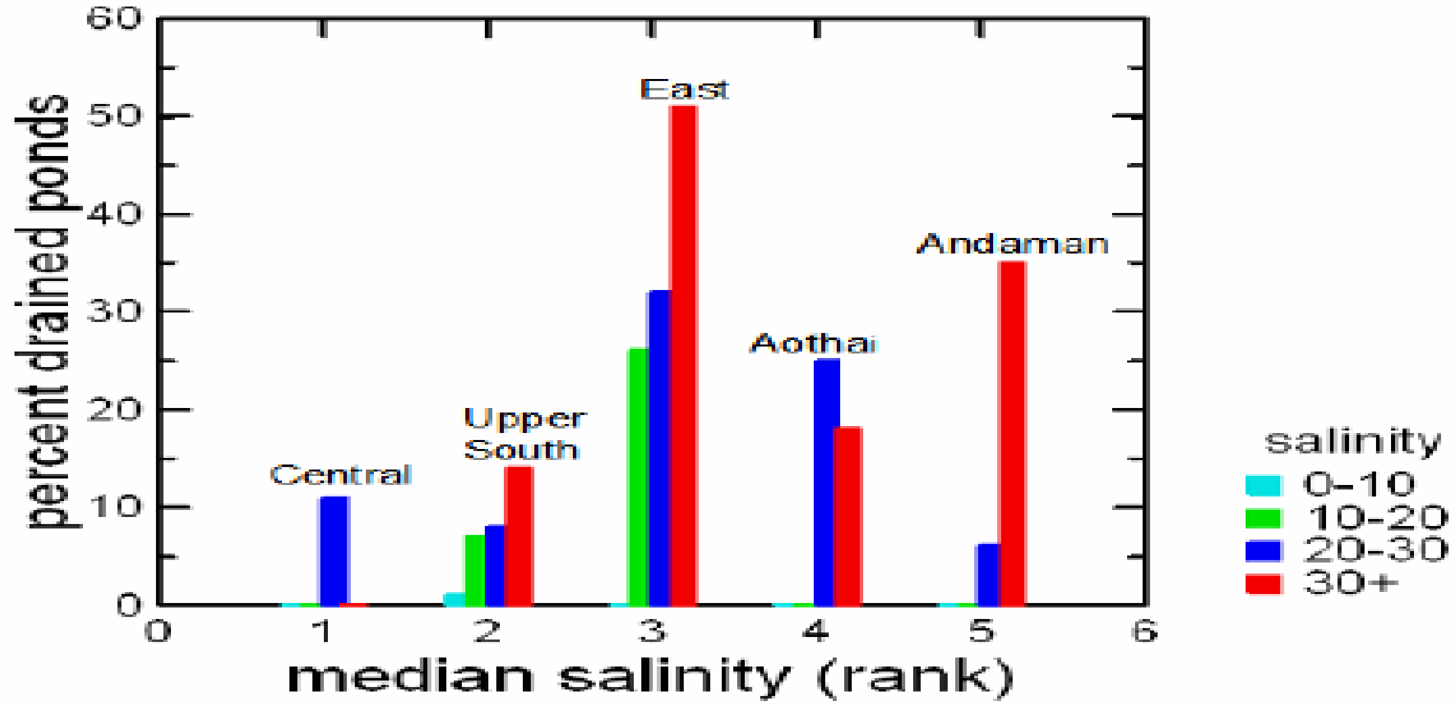


CICLOS CORTOS



3) SALINIDAD

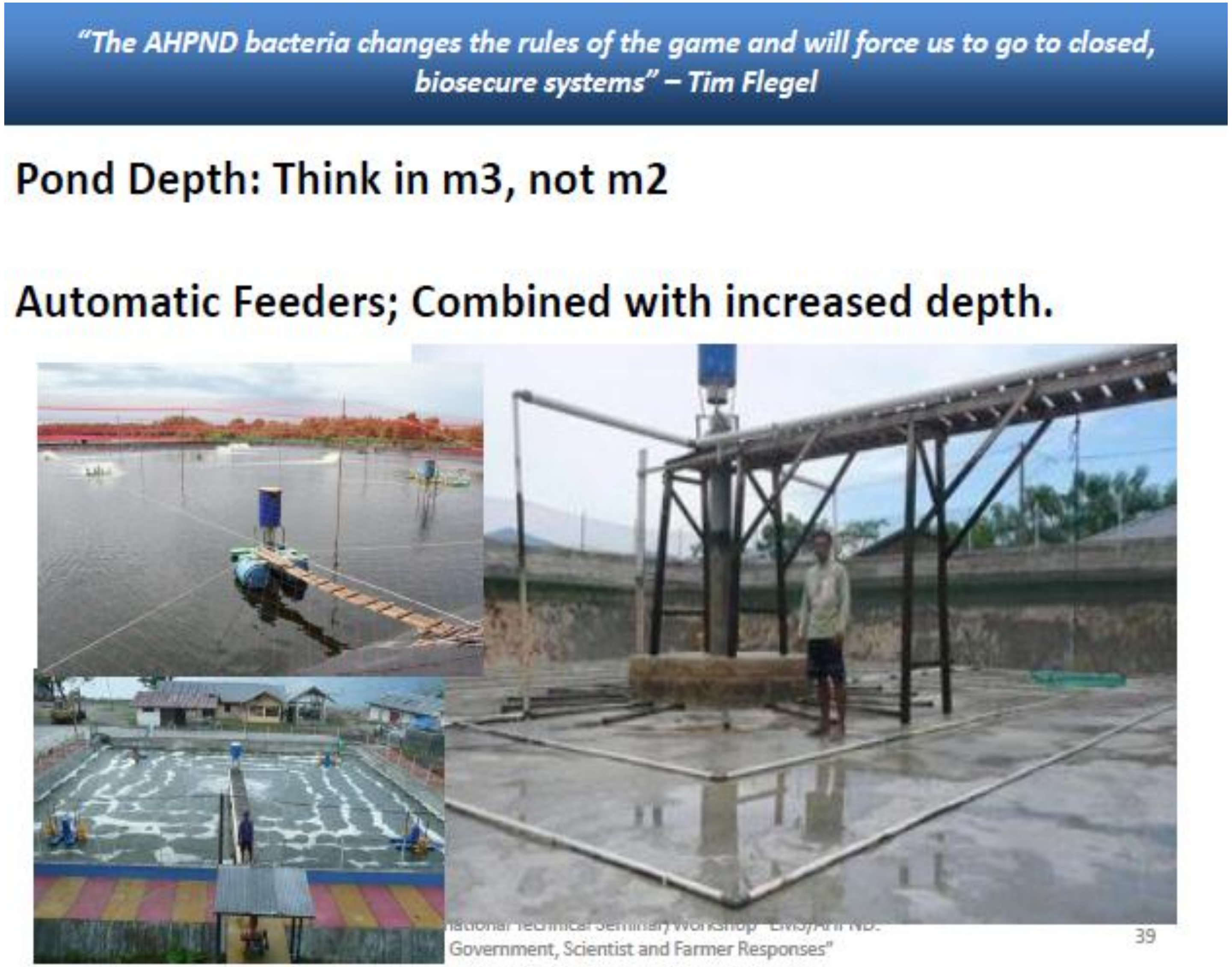
Salinity Effects later corroborated With data from Thailand



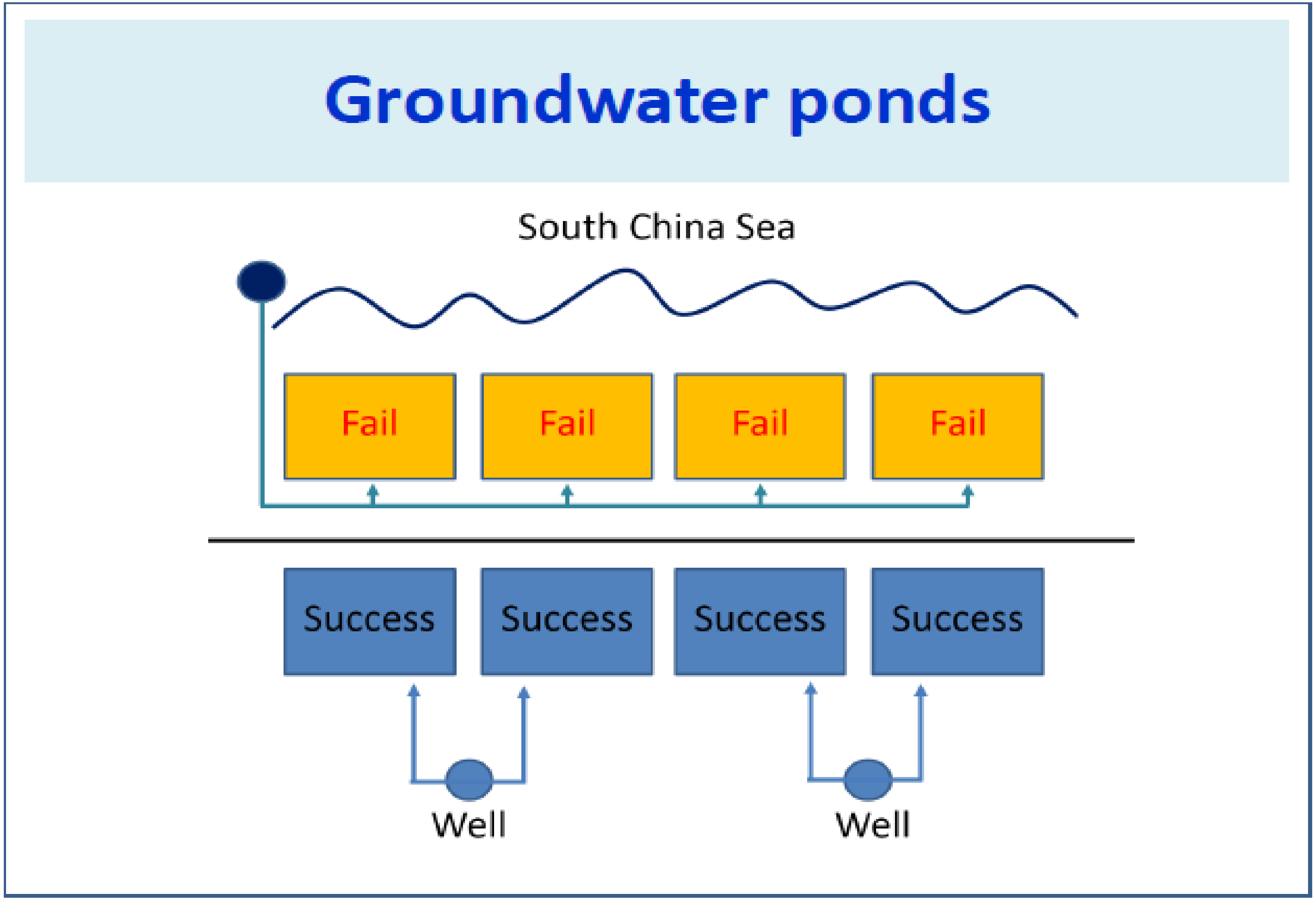
Thailand: Jan to May 2013

5) FONDOS LIMPIOS

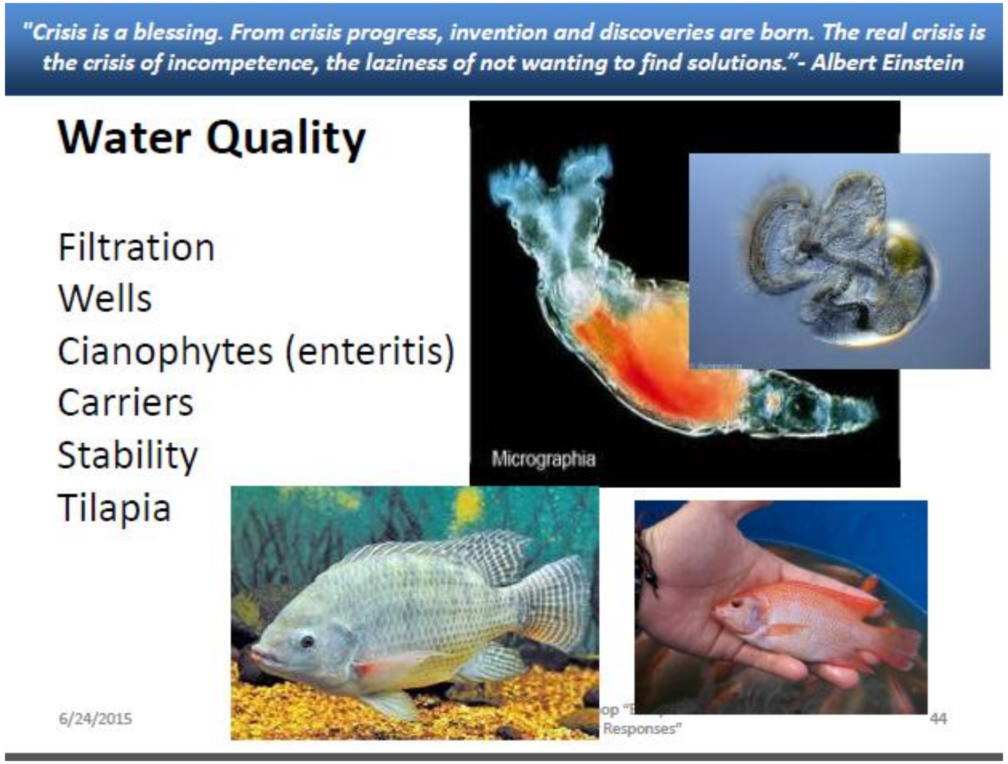
1) Plastico.
2) Sifoneo
3) Aereacion
4) Probioticos (fondo lodo)



6) POZOS


Groundwater ponds
South China Sea
Fail
Fail
Fail
Fail
Success
Success
Success
Success
Well
Well

TILAPIA


"Crisis is a blessing. From crisis progress, invention and discoveries are born. The real crisis is the crisis of incompetence, the laziness of not wanting to find solutions."- Albert Einstein
Water Quality
Filtration
Wells
Cianophytes (enteritis)
Carriers
Stability
Tilapia
Micrographia
6/24/2015
Responses"
44

VENTAJAS CICLO CORTO

FLUJO BIOLOGICO, FINCA LA DANTA, AÑO 2015.

	FEBRERO						MARZO						ABRIL					
	5	10	15	20	25	28	5	10	15	20	25	30	5	10	15	20	25	30
8					S													20661
9					S													14550
10					S													15714
11					S													16005
12					S													15423
13					S													
14					S													
15					S													
16					S													
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24						S												
25	S																	
26																		

	MAYO						JUNIO						JULIO						AGOSTO					
	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
8		H		S													20661		H		S			
9		H		S													14550		H		S			
10		H		S													15714		H		S			
11		H		S													16005		H		S			
12		H		S													15423		H		S			
13	15569		H		S													15569		H		S		
14	16005		H		S													16005		H		S		
15	16151		H		S													16151		H		S		
16	16005		H		S													16005		H		S		
17	15714		H		S													15714		H		S		
18		25608		H		S													25608		H		S	
19		7857		H		S													7857		H		S	
20		9749		H		S													9749		H		S	
21		16442		H		S													16442		H		S	
22		16296		H		S													16296		H		S	
23			35648		H		S													35648		H		S
24			38558		H		S													38558		H		S
25																								
26	311,958						0												311958					

	SEPTIEMBRE						OCTUBRE						NOVIEMBRE						DICIEMBRE					
	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
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9										14550		H												
10										15714		H												
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19												7857		H										
20												9749		H										
21												16442		H										
22												16296		H										
23													35648		H									
24													38558		H									
25																								
26	0						82,354						229,603											

TOTAL LIBRAS DE CAMARON 935,873

TOTAL LIBRAS DE ALIMENTO 1,403,809

S SIEMBRA PRECRIA

S SIEMBRA TRANSFERENCIA

H COSECHA

COMAPRACION CICLOS CORTOS CAMARON PEQUENO VS. CICLOS LARGOS CAMARON GRANDE

PEQUENO 3X/ANO

- **BASES**

NO EXCEDER 800GR/M2 TERMINACION

255 DIAS DE CULTIVO OPTIMO EN EL ANO

75% SUPERVIVENCIA

1.02 GR/SEM

100 CAM/M2

GRANDE 2X/ANO

- **BASES**

NO EXCEDER 800GR/M2 TERMINACION

255 DIAS DE CULTIVO MAXIMO EN EL ANO

75% SUPERVIVENCIA

1.00 GR/SEM

65 CAM/M2

COMAPRACION CICLOS CORTOS CAMARON PEQUENO VS. CICLOS LARGOS CAMARON GRANDE

PEQUENO 3X/ANO

- **BASES**

18,000 LBS/CICLO

75 DIAS/CICLO X 3

11 GRMS

51-60 = $2.60

61-70 = $2.40

$135,000 VENTAS BRUTAS/ANO/HA

GRANDE 2X/ANO

- **BASES**

18,000 LBS/HA

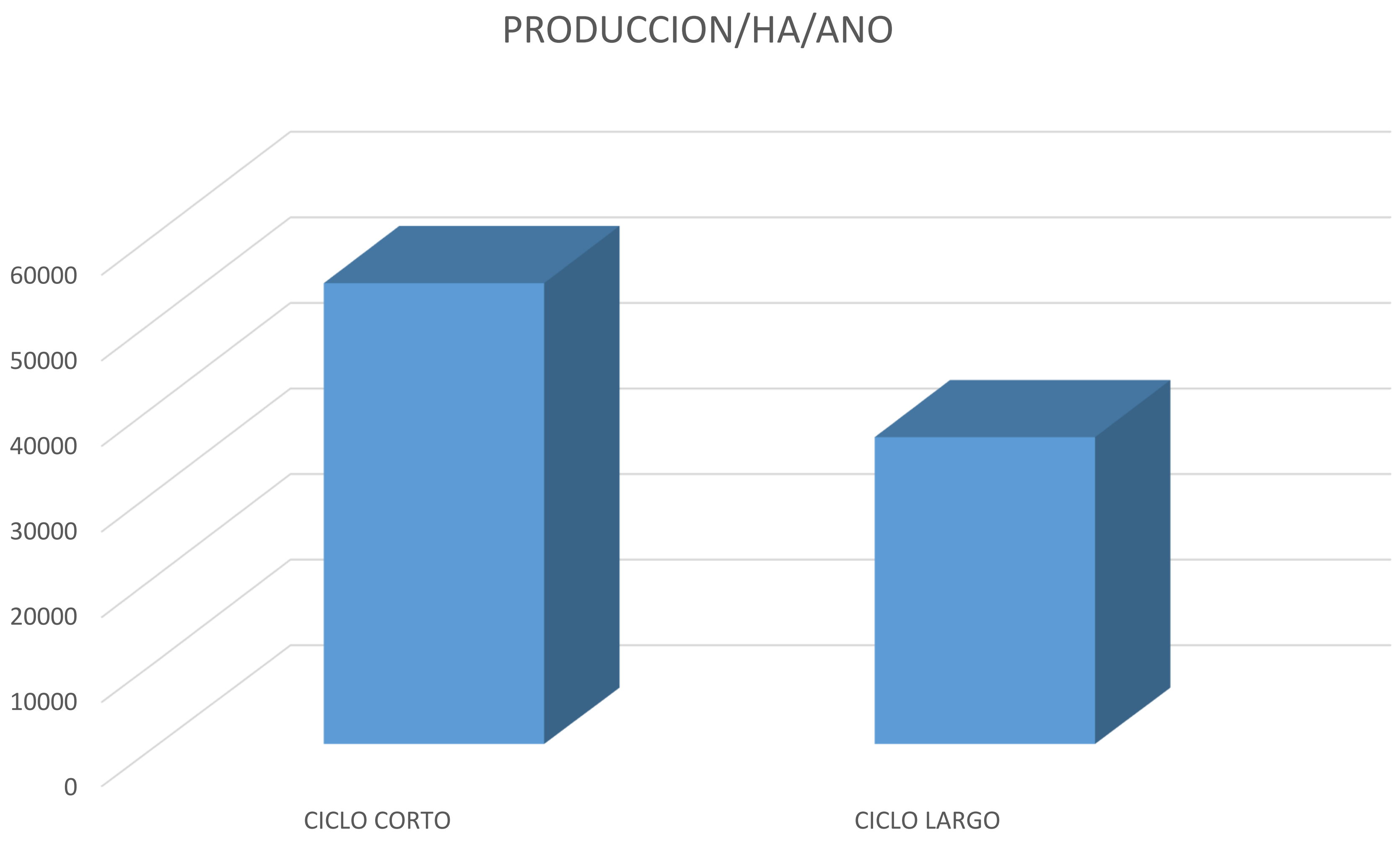
120 DIAS/CICLO X 2

17 GRAMOS

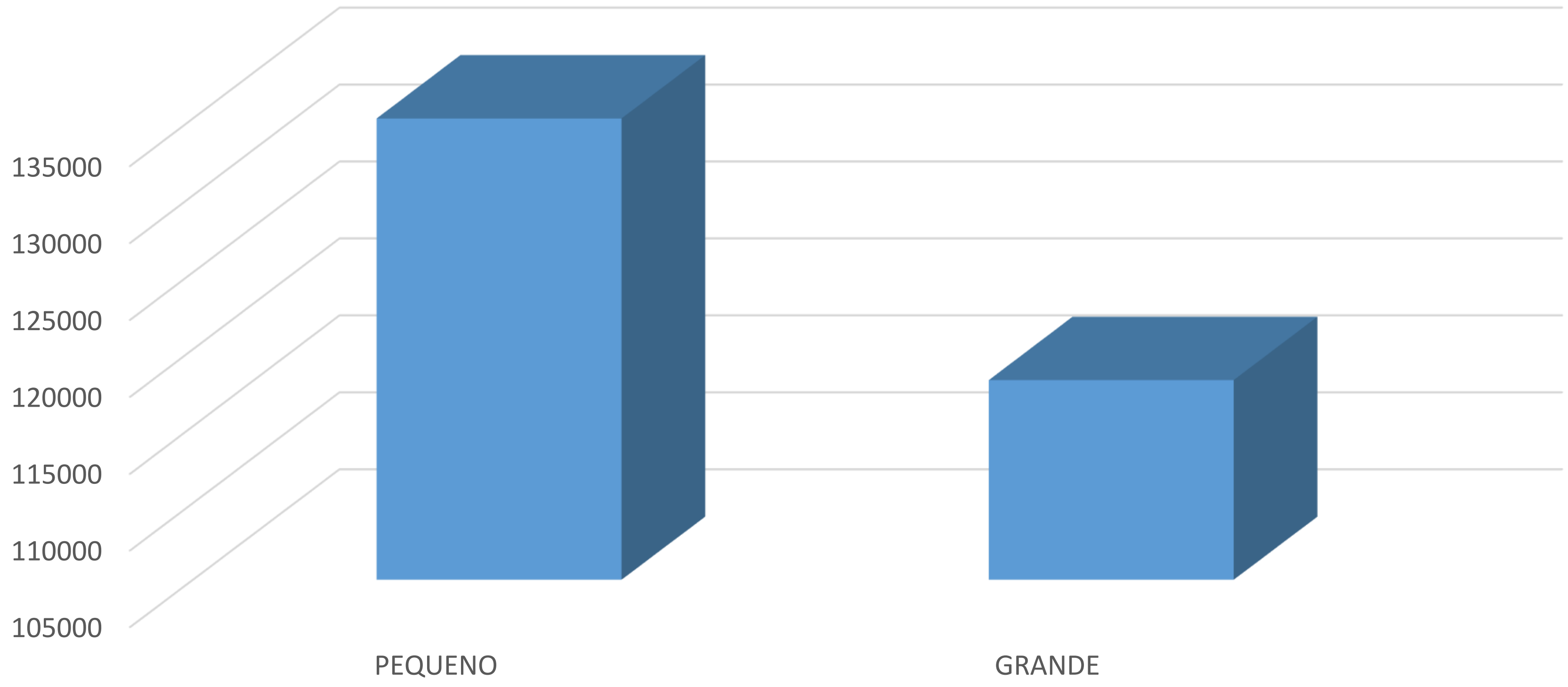
36-40 = $3.45/LB COLA

41-50 = $3.15/LB COLA

$118,800 VENTAS BRUTAS/ANO/HA


PRODUCCION/HA/ANO
60000
50000
40000
30000
20000
10000
0
CICLO CORTO
CICLO LARGO

VENTAS POR ANO



MUCHO MENOS RIESGO

1) 75 DIAS DE CULTIVO VS. 120
2) MAS SECADO DE FONDOS
3) AGUA RENOVADA CADA 75 DIAS EN VEZ DE 120
4) MINIMIZACION DE RIESGO ENTRE TRES CICLOS EN VEZ DE DOS.
5) REDUCIR COSTO DE SEMILLA
6) REDUCIR COSTO DE TRANSPORTE DE SEMILLA Y BALANCEADOS
7) REDUCIR EL COSTO DE PROCESSO.

EN FIN…..SE DIVIDE LO QUE VIENE HACIENDO COSTOS FIJOS EN SU MAYORIA, POR MAS LIBRAS.