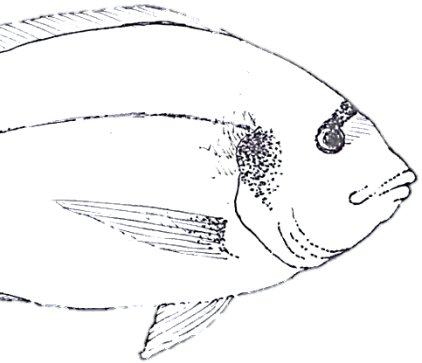
ParaFishControl

Functional Feed Additives to Reduce the Impact of *Enteromyxum leei*



ParaFishControl Final Conference

"Innovative Strategies to Control Parasites in Aquaculture Farms"

WEBINAR, 11th March 2020

Ariadna Sitjà-Bobadilla, CSIC

CSIC
Consejo Superior de Investigaciones Científicas

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1 What is the problem we aim to solve ?

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What is the problem we aim to solve?

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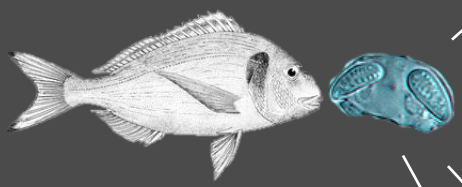
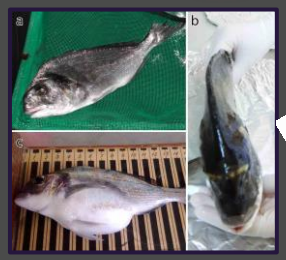
Parasitic enteritis in gilthead sea bream *(Sparus aurata)*



Enteromyxum leei
Myxozoan
Endemic



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2 Our tools

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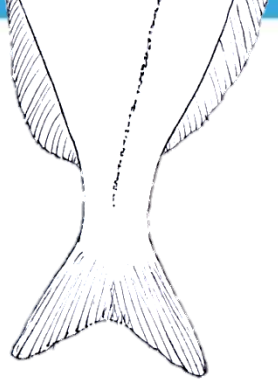
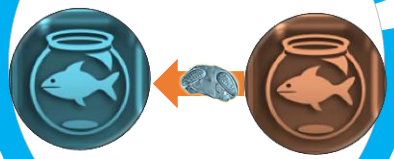
Experimental models of transmission



PARASITE DIAGNOSIS

Effluent

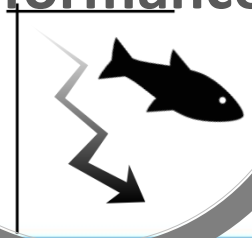


Anal intubation

Samples: Lethal Non-lethal

qPCR: Copies of parasite DNA/fish

Growth Performance



Histology: Extension of infection Parasite stages

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3 THE ADDITIVES & DIETS

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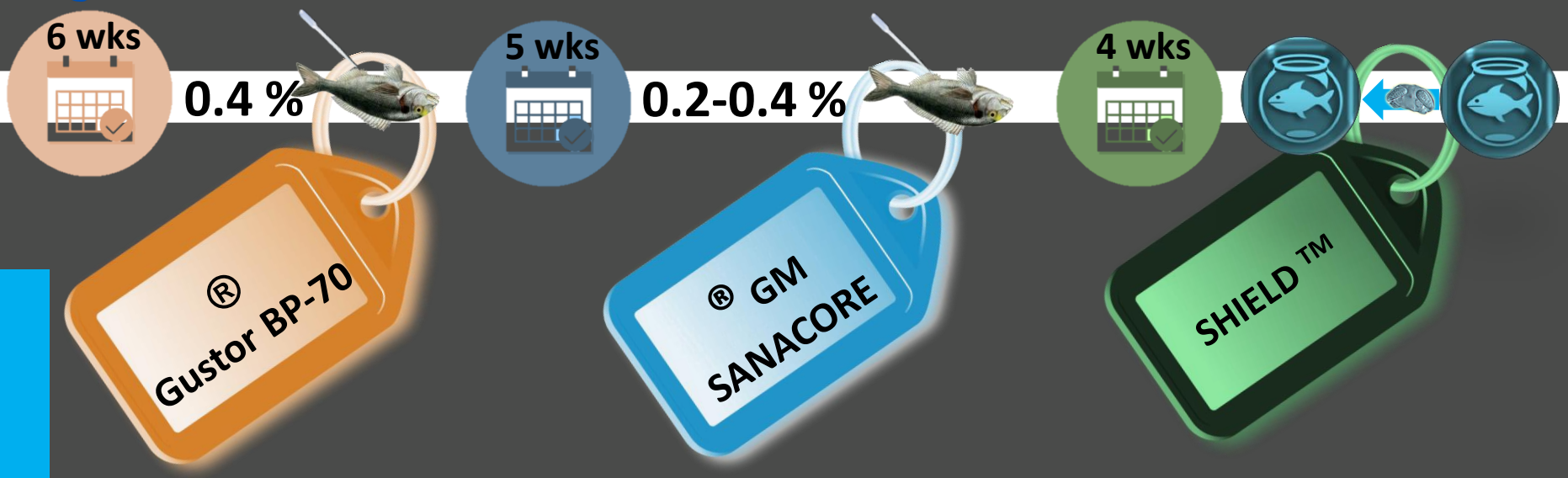
DIFFERENT TRIALS



Sodium butyrate (SCFA) (70%) + vegetable fat (30%) that allows the active principle to be active along the entire gastrointestinal tract

Health-promoting additive: mixture of organic acids, inactivated yeast and yeast extracts with herbal extracts on a mineral carrier

Diet including: functional ingredients, prebiotics, trybutirin and natural extracts. Specific formulation to support damaged organs and impaired physiological processes (e.g., raw materials balance, macro and micronutrients)

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3 THE IMPROVED RESULTS

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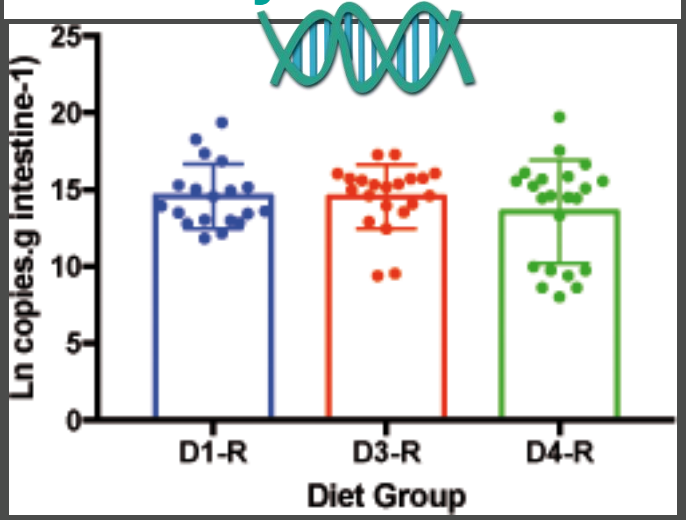
® Gustor BP-70

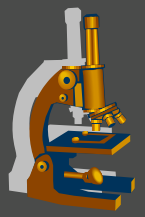
Prevalence of infection

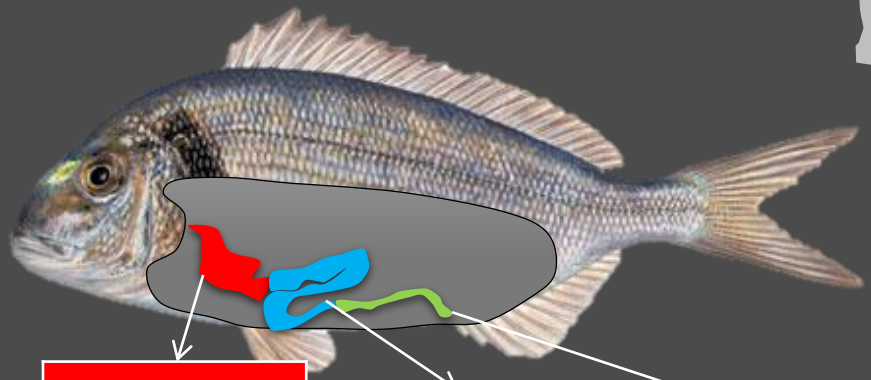
79.2%	87.5%	91.7%

Intensity of infection



Extension of the infection





ANTERIOR*	
D1	12.5
D3	66.7
D4	40

MIDDLE	
D1	0
D3	27
D4	33.3

POSTERIOR	
D1	56.3
D3	93.3
D4	80

D1 = CTRL diet	D3 = high vegetable	D4 = high vegetable + BP-70

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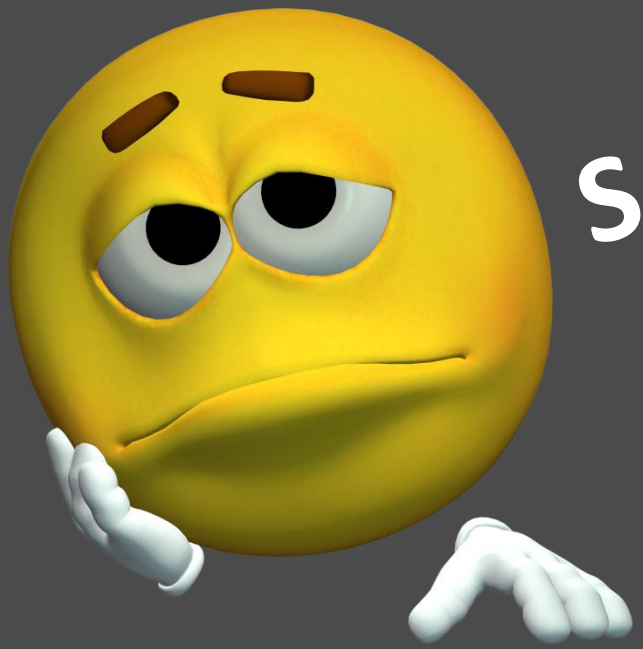

So what?

In parasitized fish (Recipient):

- Weight loss is higher in the extreme vegetable diet (D3)
- Weight loss is refrained by BP-70 (D4)

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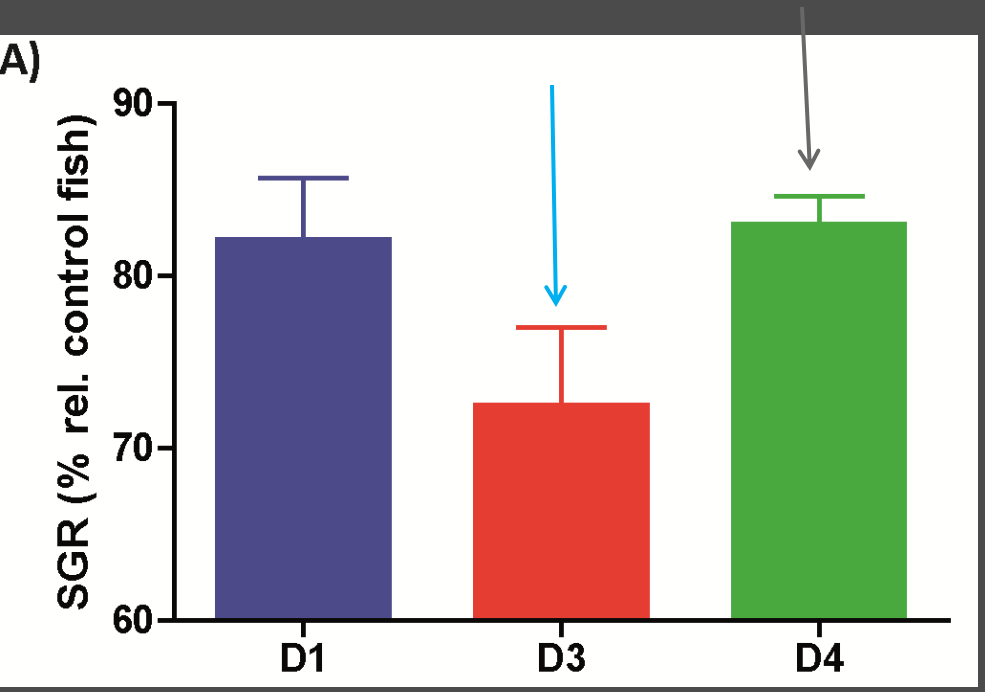

Specific growth rate

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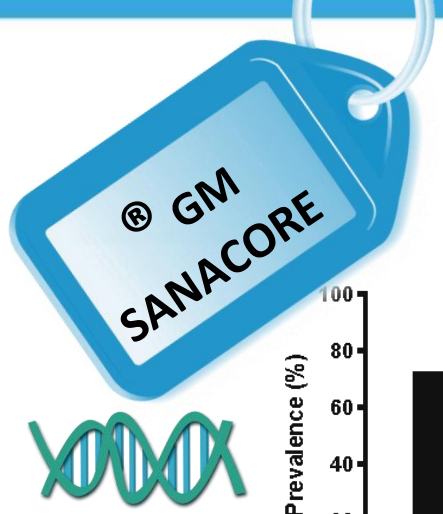
Being infected does not always mean being diseased!

Resilience



A = 0 % **B = 0.2 %** **C = 0.4 %**

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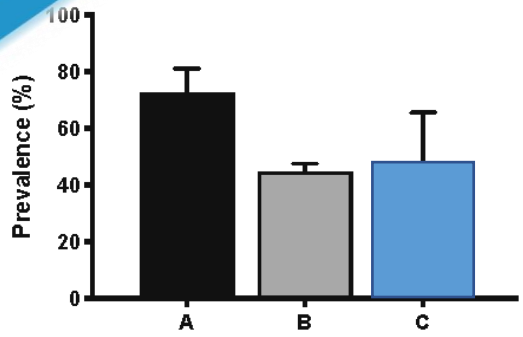
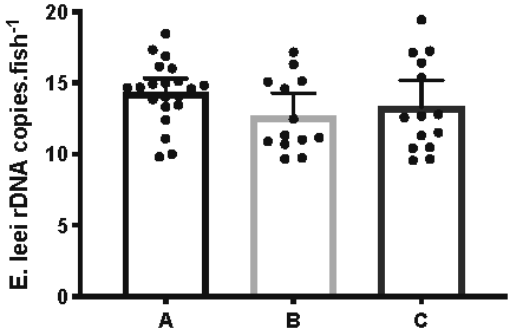
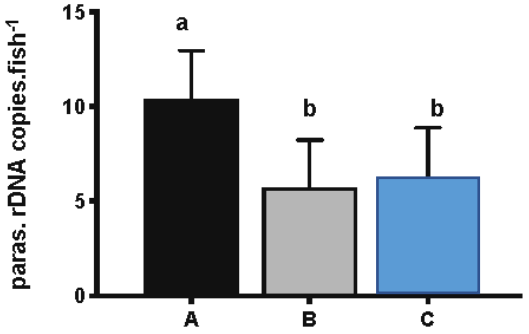
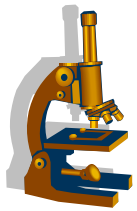
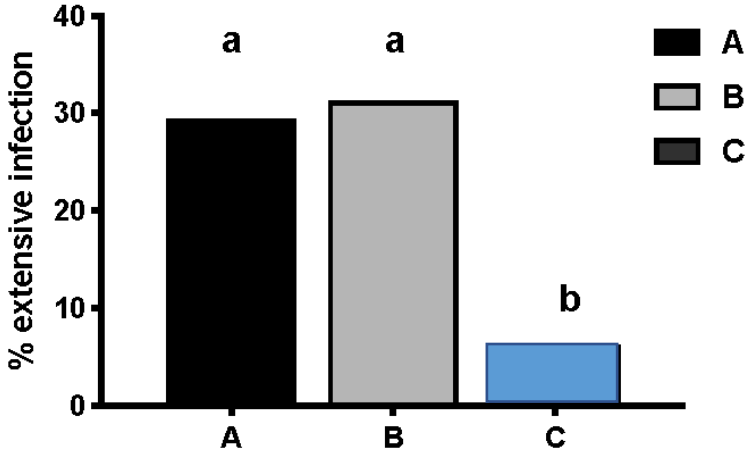


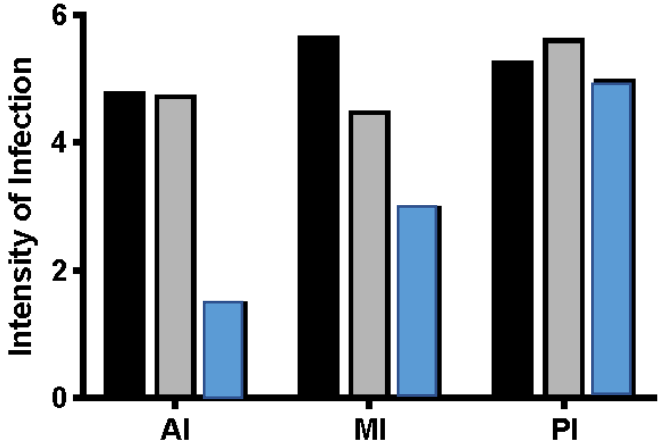




SANACORE-fed groups presented lower prevalence of infection and a lower parasite load







SANACORE-fed groups had less extension of the infection along the intestinal tract

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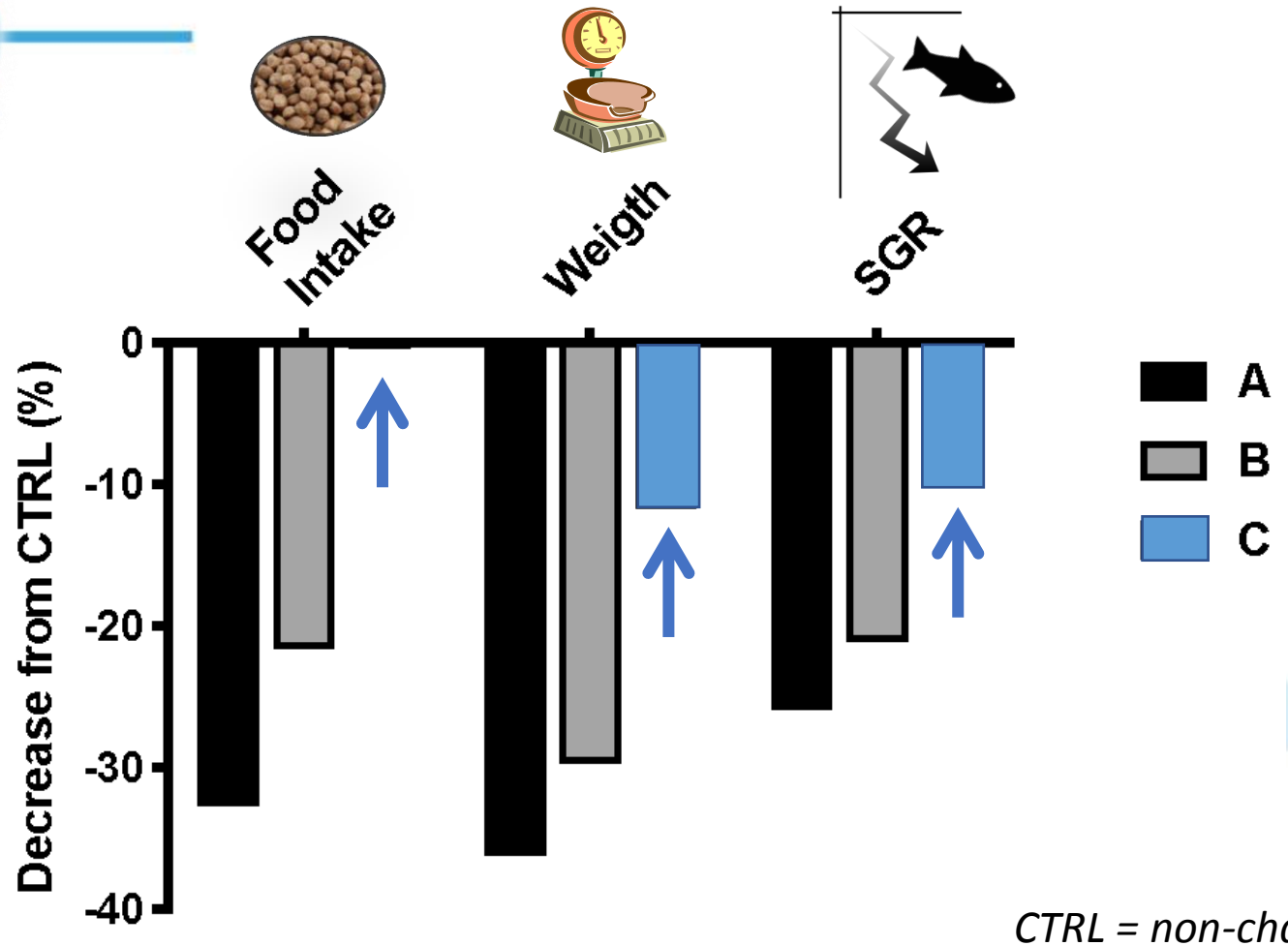
® GM SANACORE



CTRL = non-challenged

Supplemented diets mitigated the anorexia and growth arrestment observed in diet A

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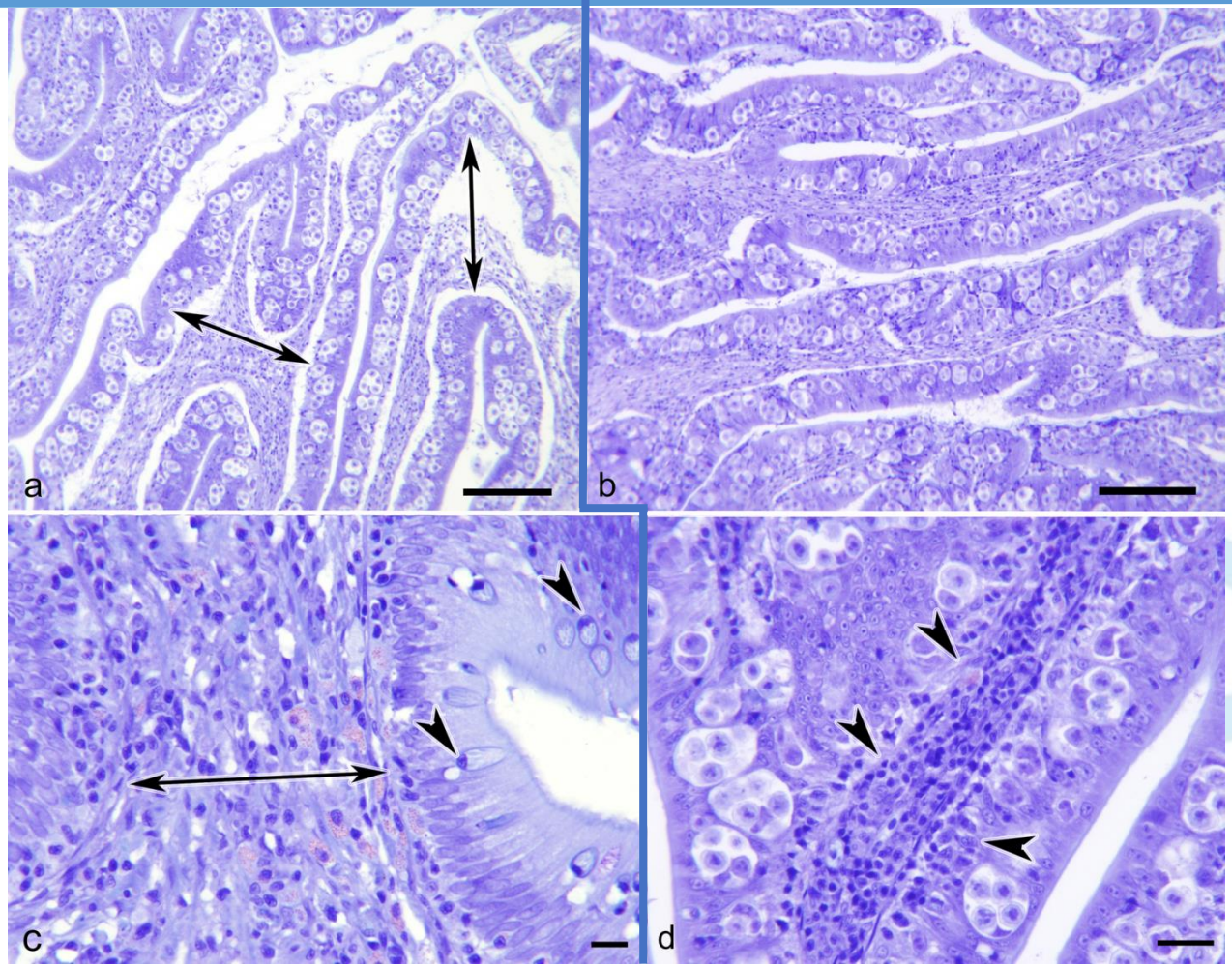
A = 0 %

C = 0.4 %



C diet had less inflammation of submucosa and desquamation of the intestinal epithelium

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30 %

55.7 %

3.34×10^6

22 %

47.4 %

0.47×10^6

Intensity (no. parasites/fish): lowered in SHIELD-fed by 85%

Mean prevalence (%): lowered in SHIELD-fed by 26.6 %

Reduction of weight gain after challenge compared to the unchallenged groups

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5 CONCLUSIONS

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- ✓ We cannot get 0 % infected fish
- ✓ Fish are still parasitized: they could pass infection to other fish

- ✓ Intestinal health is improved: so useful for other enteritis
- ✓ Lowered parasite prevalence and intensity
- ✓ Fish can cope with the parasite: resilience
- ✓ Fish do not have the main disease sign: loss of weight

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Filling the gap:

The industry can reduce economic losses

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Published information

ESTENSORO, I., BALLESTER-LOZANO, G., BENEDITO-PALOS, L., KARALAZOS, V. MALLO, J.J., SITJÀ-BOBADILLA, A., GRAMMES, F., ØVERLAND, M., PÉREZ-SANCHEZ, J. 2016. Dietary butyrate contributes to restore the normal intestinal phenotype of gilthead sea bream (*Sparus aurata*) fed extreme plant proteins and oil based diets.
PLoS ONE 11(11): e0166564

OPEN ACCESS

PIAZZON, M.C., CALDUCH-GINER, J.A., FOUZ, B., ESTENSORO, I. SIMÓ-MIRABET, P., PUYALTO, M., KARALAZOS, V., PALENZUELA, O., SITJÀ-BOBADILLA, A., PÉREZ-SÁNCHEZ, J. 2017. Under control: how a dietary additive can restore the gut microbiome and proteomic profile, and improve disease resilience in a marine teleostean fish fed vegetable diets.
BMC Microbiome, 5 (164):18-23

OPEN ACCESS

PALENZUELA, O., DEL POZO, R., PIAZZON, M.C., ISERN-SUBICH, M.M., CEULEMANS, S., COUTTEAU, P., **SITJÀ-BOBADILLA, A**.2020. Effect of a functional feed additive on mitigation of experimentally induced gilthead sea bream (*Sparus aurata*) enteromyxosis. **Diseases of Aquatic Organisms , 27: 111-120**

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THANKS to:

Nutrigenomics and Fish Growth Endocrinology group

Fish Pathology group

Instituto de Acuicultura de Torre de la Sal (IATS-CSIC)

www.parafishcontrol.eu

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Thank You

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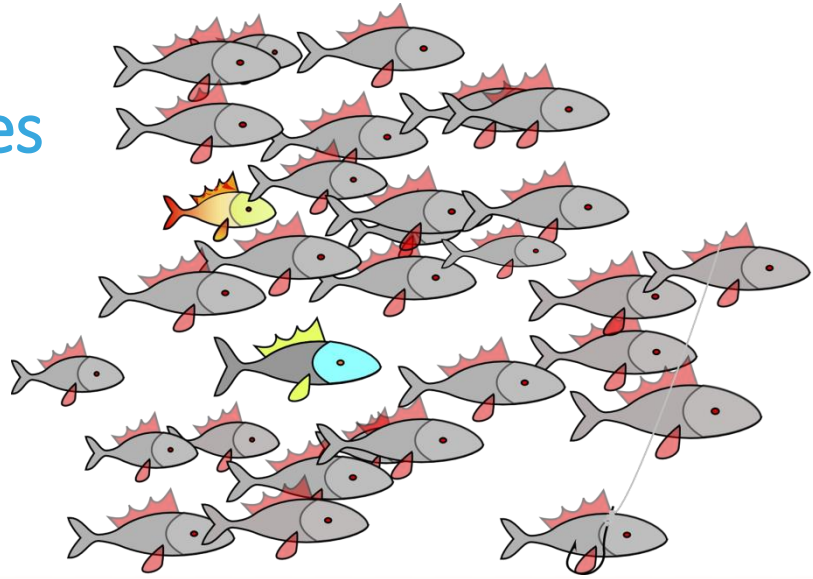

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Thanks for your attention

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