

Neurobehavioral impairments in the sea bass (*Dicentrarchus labrax*) chronically exposed to cadmium and ciprofloxacin contaminated diets.

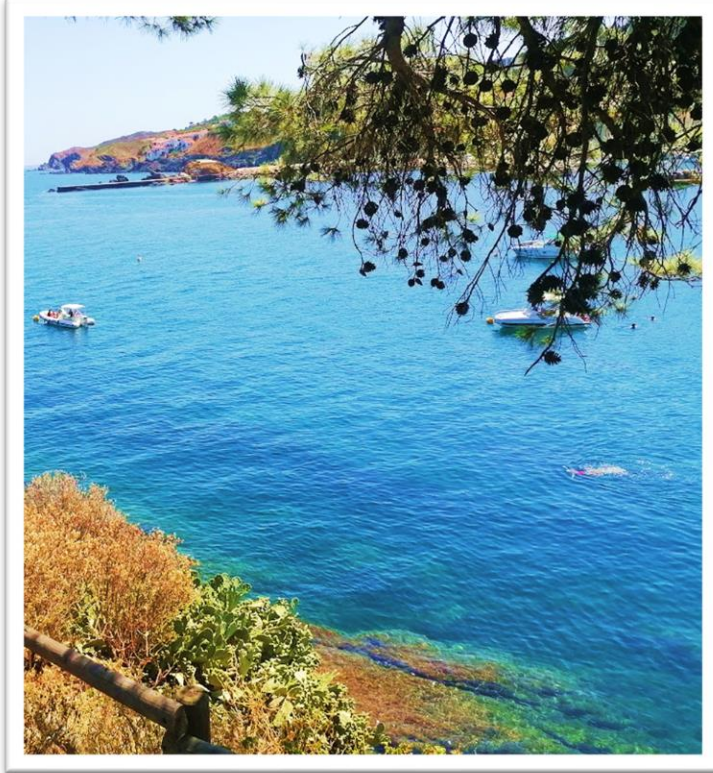
Juliette Bedrossiantz¹, Léo Martin¹, Janan Gawra¹, Nerea Sanchís², Paula Medina², Demetrio Raldúa, Joana Pereira³, Mercedes Blázquez² and Laia Navarro-Martín¹

¹Department of Environmental Chemistry, Institute of Environmental Assessment and Water Research (IDAEA-CSIC), Barcelona, Spain

²Department of Renewable Marine Resources, Institute of Marine Sciences (ICM-CSIC), Barcelona, Spain

³Department of Biology, University of Aveiro, Aveiro, Portugal

juliette.bedrossiantz@idaea.csic.es



Environmental contamination by heavy metals and pharmaceuticals poses significant risks to marine ecosystems, as they can alter the behavior and survival of aquatic organisms.



Cadmium (Cd) is a heavy metal recognized for its high neurotoxicity even at low concentrations such as those found in natural ecosystems. Ciprofloxacin (Cipro) is a fluoroquinolone antibiotic. Increasingly detected in aquatic environments, it could alter microbial communities, affecting the gut health of fish and interfering with neuronal functions through the microbiota-gut-brain axis.

Understanding the sublethal effects of two environmental contaminants in the juvenile model of European sea bass *Dicentrarchus labrax* after 21 days of dietary exposure

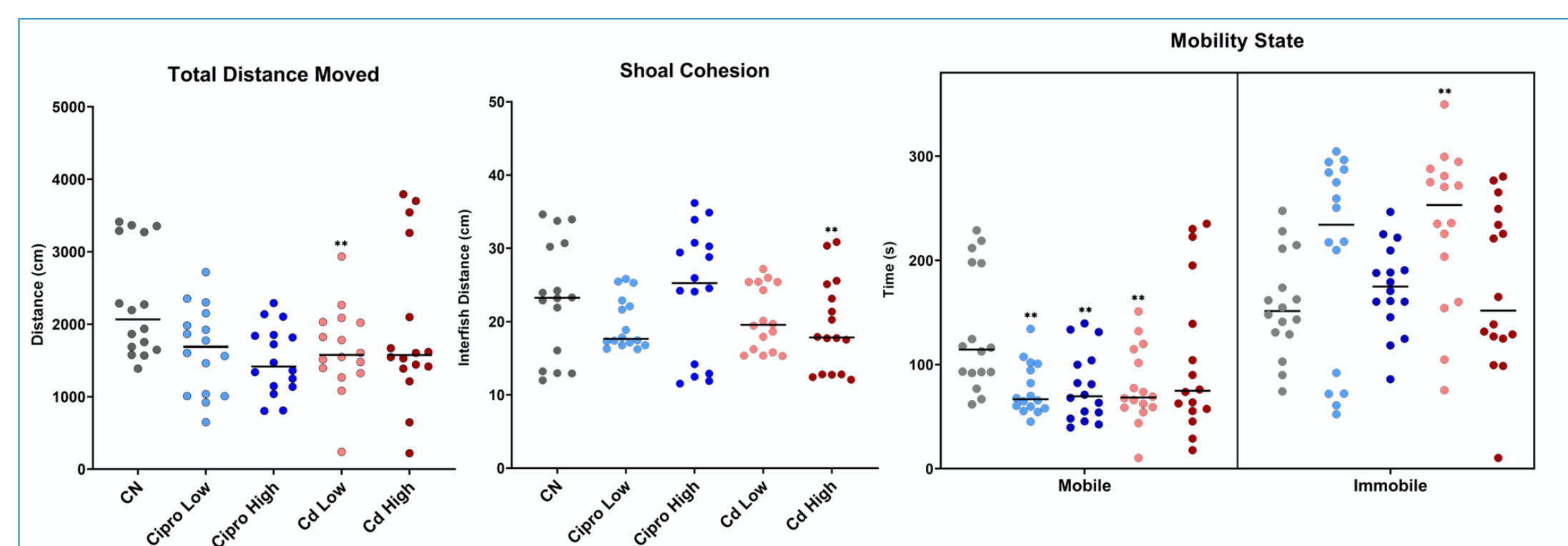
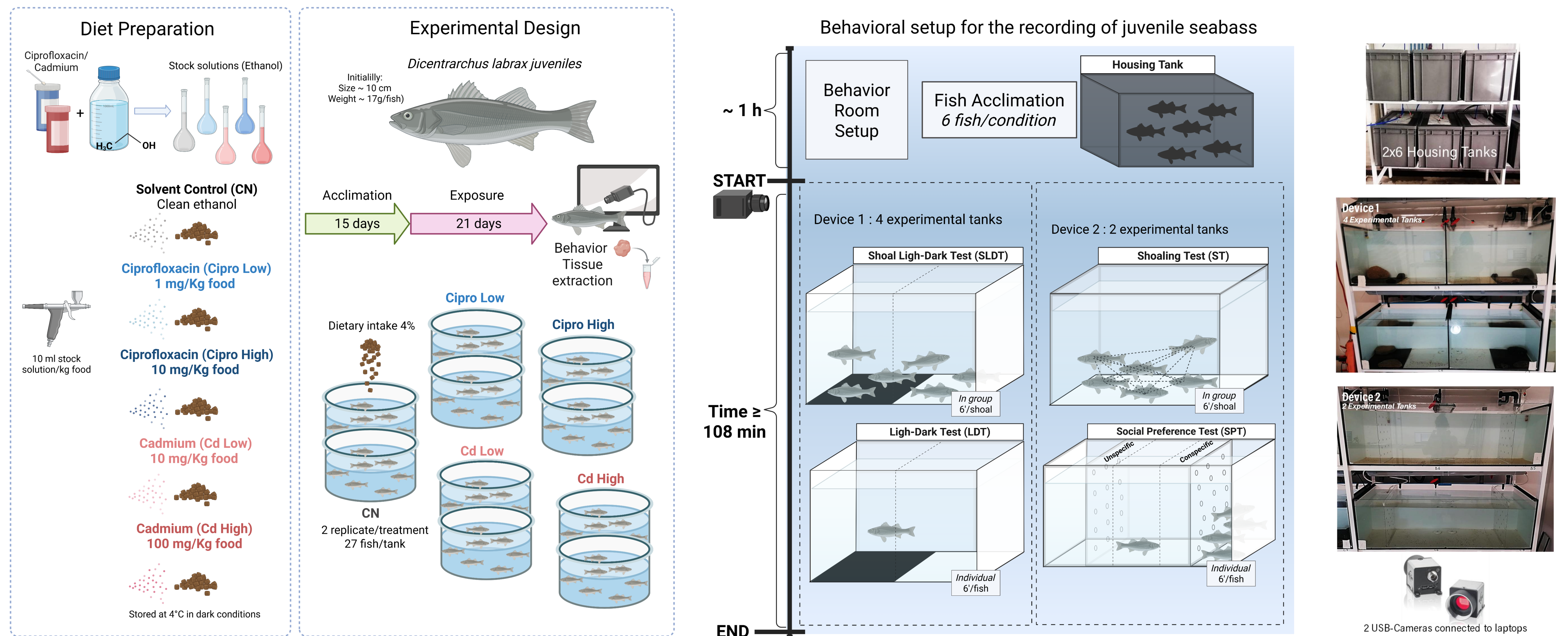


Fig 1. Behavioral changes observed in the **Shoaling Test (ST)** in juvenile seabass after 21 days-exposure. In the ST, a tendency towards cohesion was observed, significant in animals exposed to the highest concentration of Cd.

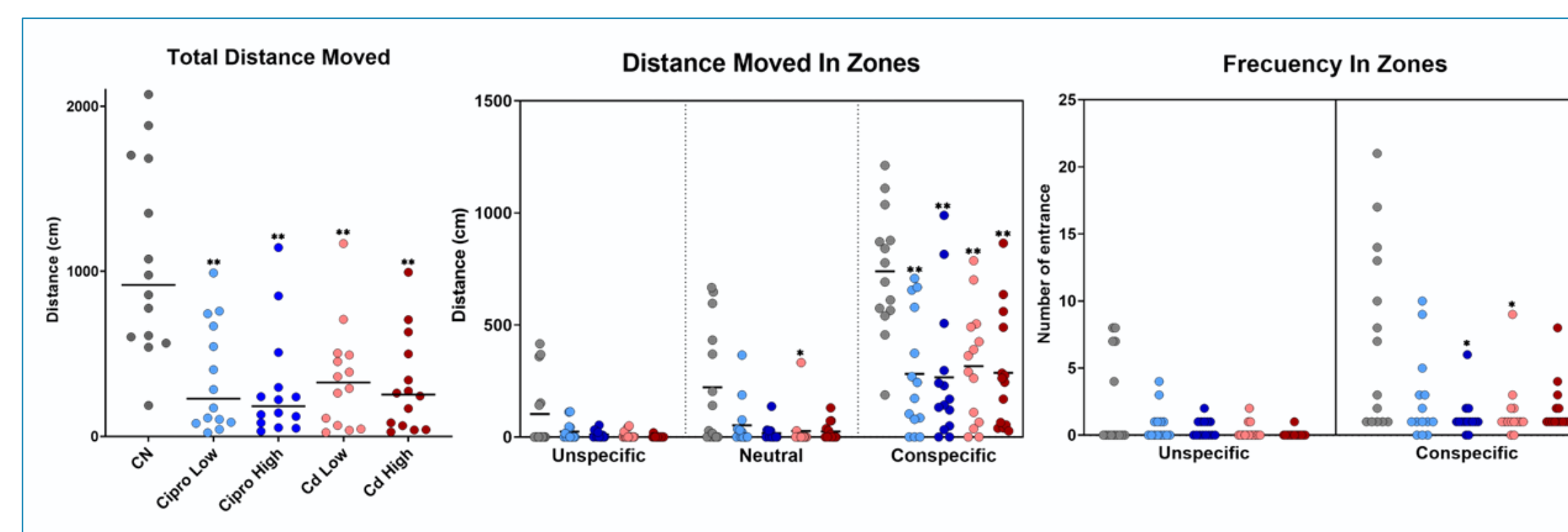


Fig 2. Behavioral changes observed in the **Social Preference Test (SPT)** in juvenile seabass after 21 days-exposure. In the SPT, exposed fish showed less social interaction, with a reduction in the distance travelled in the conspecific compartment.

A significant decrease in basal locomotor activity and an increase in freezing episodes were observed in the four assays.

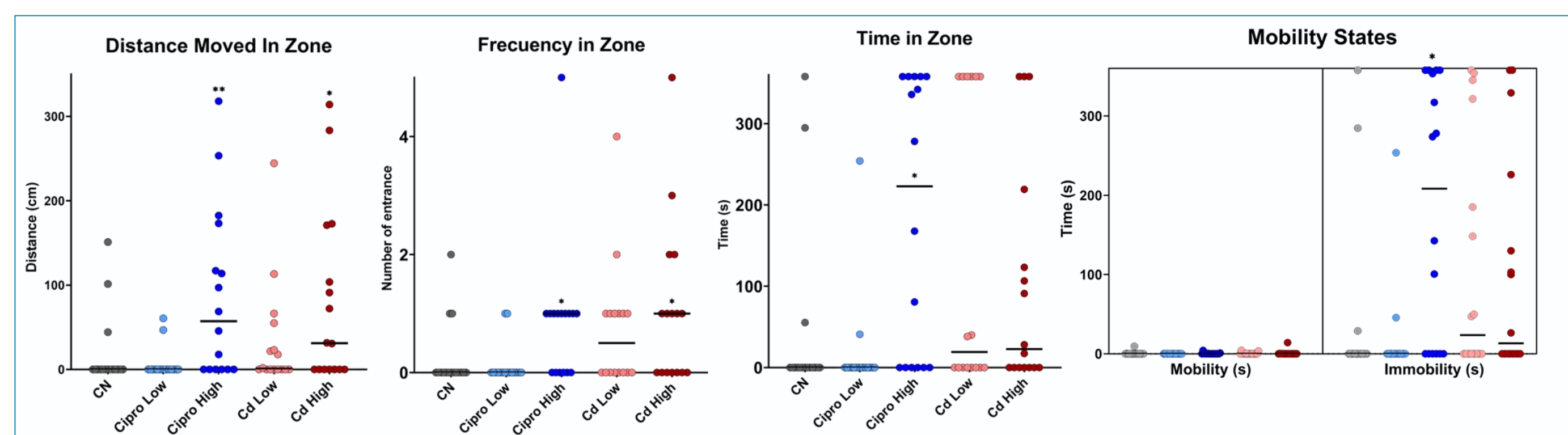


Fig 3. Behavioral changes observed in the **Light-Dark Test (LDT)** in juvenile seabass after 21 days-exposure. In the LDT, we found a pattern of anxiogenic response concomitant with depression as indicated by the prolonged time in the illuminated zone.

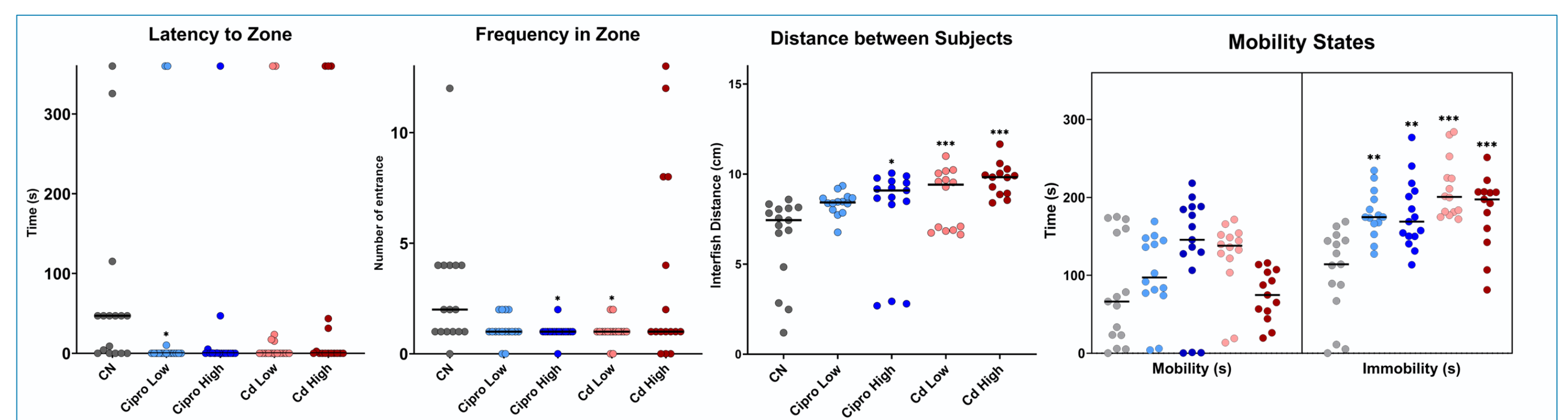


Fig 4. Behavioral changes observed in the **Shoal Light-Dark Test (SLDT)** in juvenile seabass after 21 days-exposure. In the SLDT, the time spent in the illuminated zone increased significantly confirming anxiety phenotype concomitant with depression

↓swimming activity + ~ social behavior + ↓ exploratory and decision-making = dietary exposure to environmentally relevant concentrations of Cd and Cipro could affect the survival and ecological fitness of the species.

Need to add sublethal endpoints in toxicological monitoring studies to preserve marine environments.

Further analysis will evaluate transcriptomic and epigenetic responses and link effects at the molecular level to behavioral impairment caused by exposures to Cd and Cipro.