FACULTY OF BIOSCIENCE ENGINEERING

DEPARTMENT OF ANIMAL SCIENCES AND AQUATIC ECOLOGY
RESEARCH GROUP AQUATIC ECOLOGY

INVASIVE SPECIES IN THE ECUADORIAN ANDES: *PROCAMBARUS CLARKII*, HUMANS AND ENVIRONMENTAL DNA

Lenin Riascos, Peter Goethals, L. Dominguez, R. Chiriboga, L.Benavides, A. Encarnacion , E. Velarde, R. Bermudez, J. M.l Cevallos,W. V. Berge, P. Boets, J.Bonilla, A. Geerts, Christine Van der heyden

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HO GENT

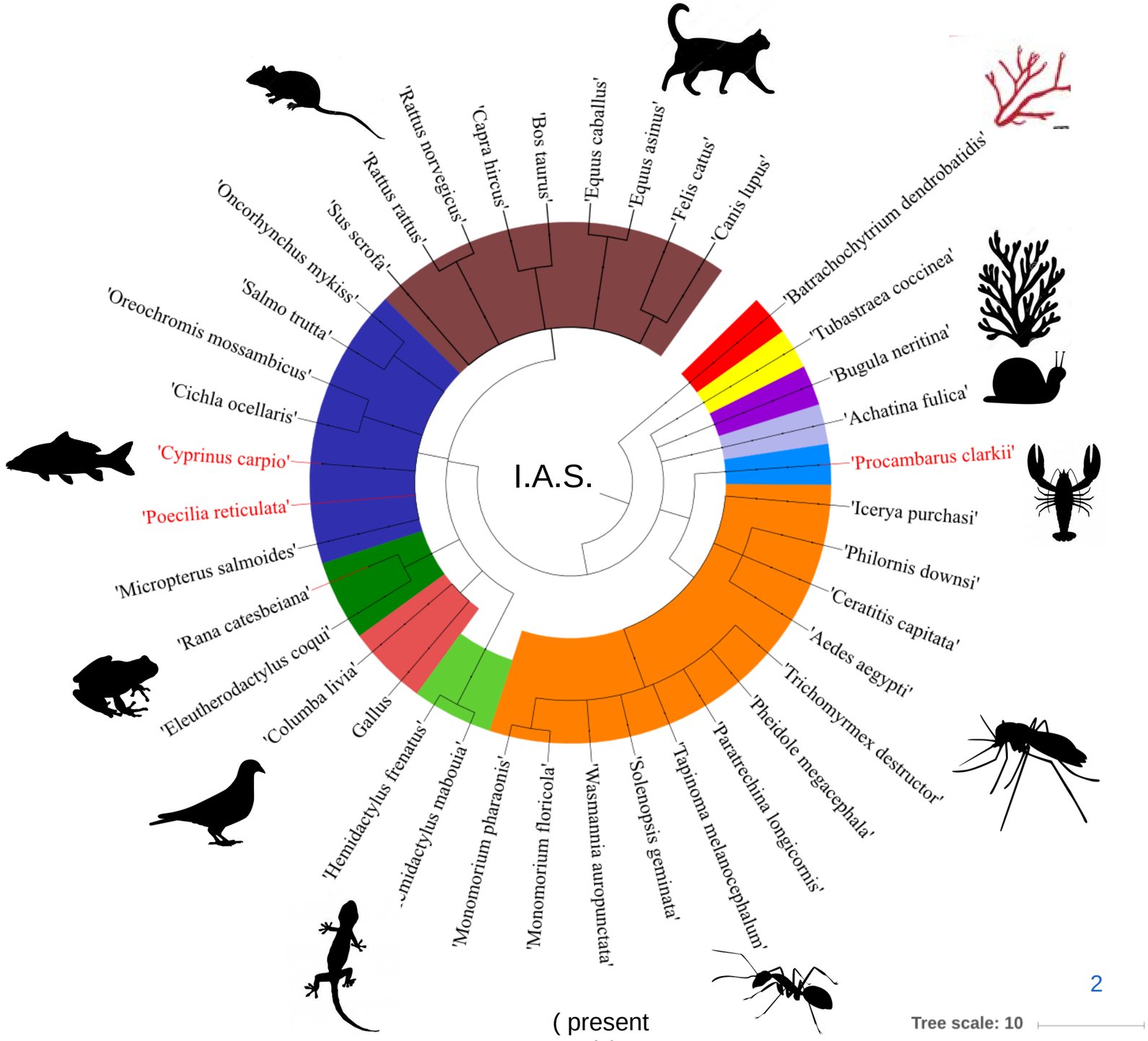
vlir network ECUADOR
ESPOL - EPN - UCUENCA - UTN

UNIVERSIDAD TECNICA DEL NORTE
UTN
IBARRA - ECUADOR

vliruos
SHARING MINDS, CHANGING LIVES

IAS IN ECUADOR

- Ecuador: one of the most biodiversity countries in the world.
- Invasive populations have not been monitored in mainland.
- Monitoring to estimate the biodiversity in aquatic ecosystems are expensive and required taxonomic expertise...



(present

Tree scale: 10

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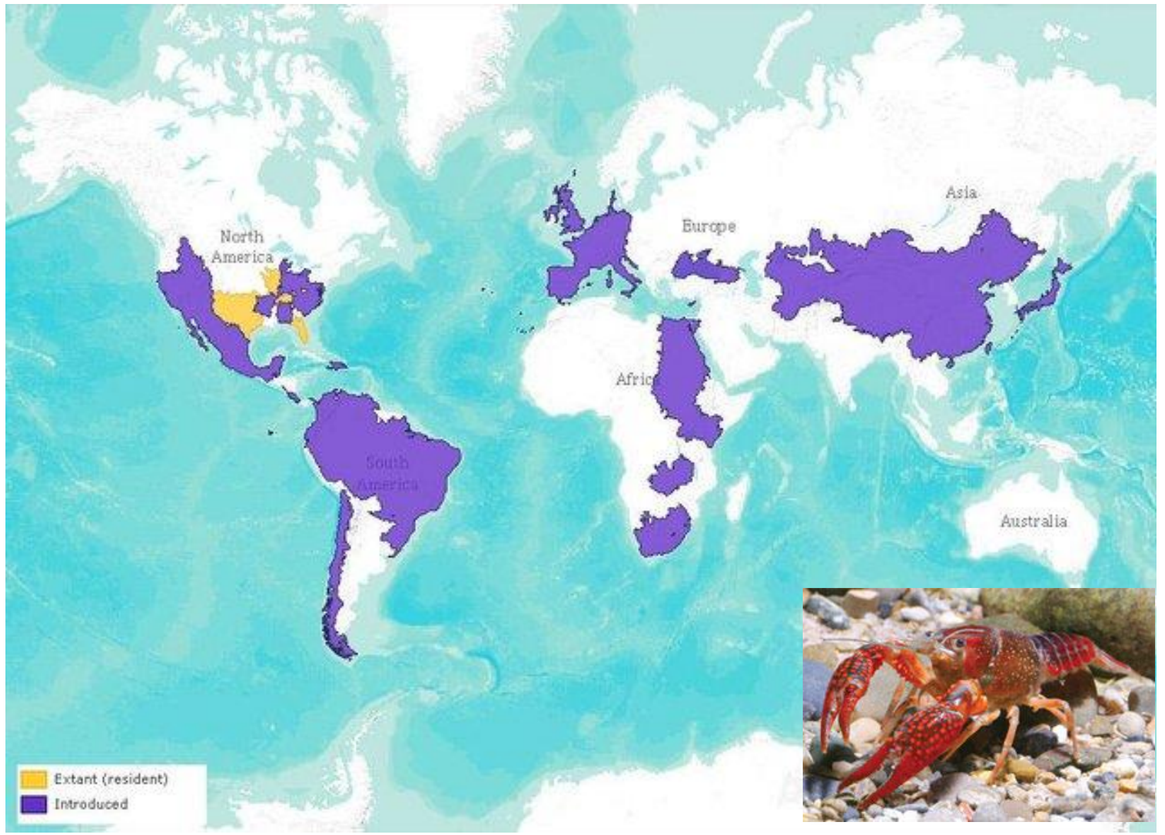
IAS-*PROCAMBARUS CLARKII*

- Native from **Louisiana**
- Invasive populations have been reported from Europe, Asia, Africa, North America, and South America.
- Impacts include:
  - **Aggressive competition** with native species
  - Introduction of the **crayfish plague** (*Aphanomyces astaci*)
  - Reduction of macrophyte assemblages
  - **Alteration of water quality**
  - Predation on and competition
  - Negative impacts on **agricultural** and **fishing industries**
- Introduced in **Ecuador** in **1986**
- Introduced in **Andean** lakes from **2013**



Distribution *P.clarkii* around the world (Loureiro et al., 2015)

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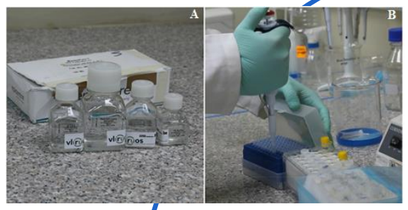
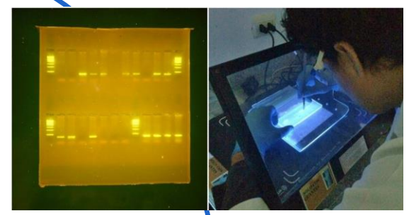
BACKGROUND -eDNA

Environmental DNA, in its simplest sense, is DNA extracted from any type of environmental sample (e.g. soil, water, air, etc.), without isolation of a particular organism

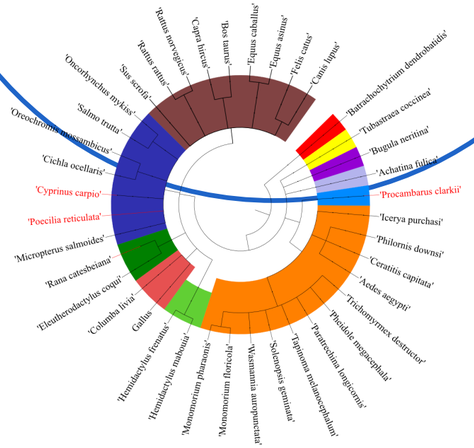
Field

+





LAB



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BACKGROUND -eDNA

TERRESTRIAL	Soil samples	Mammals, Birds, Reptiles
	Specimens and Symboses	Fungi, Microbes, Parasitoids, Arthopods
	Sediments	Fungi, Plants, Arthopods, Vertebrates, Birds
MARINE	Sediments	Eukaryptes, Metazoans, Invertebrates, Fungi, Protist, Plankton
	Specimens and biofilms	Eukaryotes, Nematodes, Diatoms, Plankton
	Water	Eukaryotes, Prokaryotes, Fungi, Protist, Plants, Vertebrates, Fish
ESTUARINE	Sediments	Eukaryotes, Metazoans, Protist, Nematodes
	Water	Plankton
FRESHWATER	Sediments	Fungi, Plants, Arthopods, Vertebrates, Birds
	Specimens and biofilms	Microbes, Plankton, Larvae, Macroinvertebrates
	Water	Plankton, Metazoans, Protist, Plants, Fungi, Fish, Amphibians, Reptile

MONITORING 2016

-3 lakes
-Methodology Efficacy 86% in comparison with traditional traps

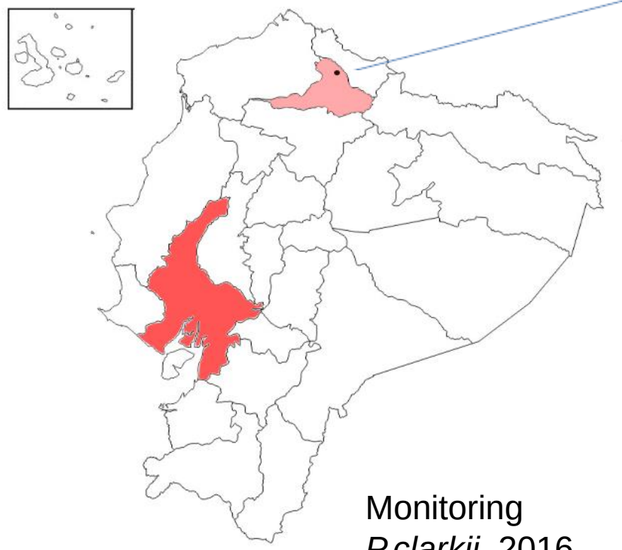
ELSEVIER

DNA-based monitoring of the alien invasive North American crayfish *Procambarus clarkii* in Andean lakes (Ecuador)

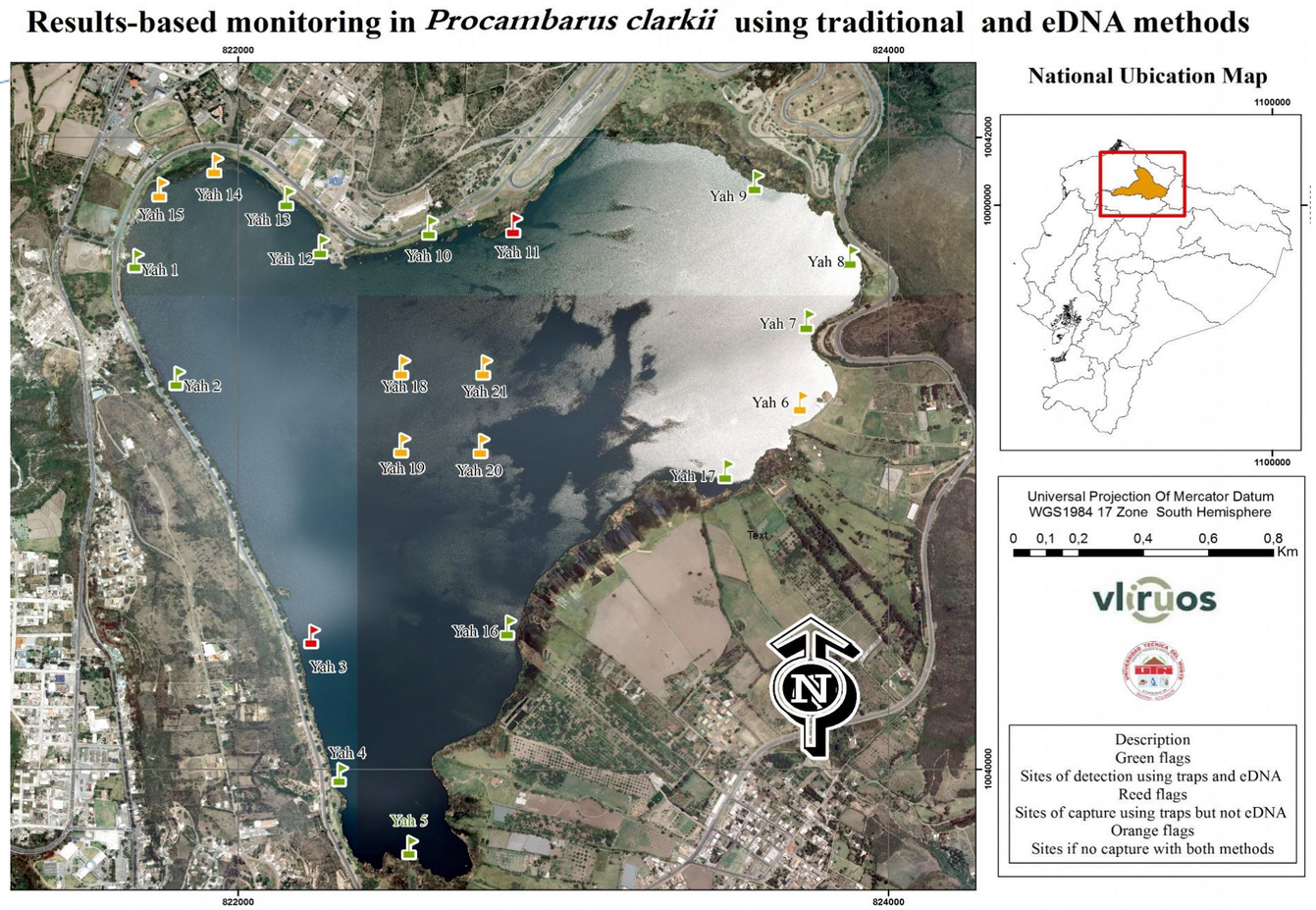
L. Riascos [a, 1], A.N. Geerts [b, 1], T. Oña [a], P. Goethals [c], J. Cevallos-Cevallos [d, e], W. Vanden Berghe [f, g], F.A.M. Volckaert [h], J. Bonilla [d, e], K. Muylaert [i], E. Velarde [a], P. Boets [c, j], Christine Van der heyden [b]

Show more

https://doi.org/10.1016/j.limno.2018.02.002



Monitoring
P,clarkii 2016



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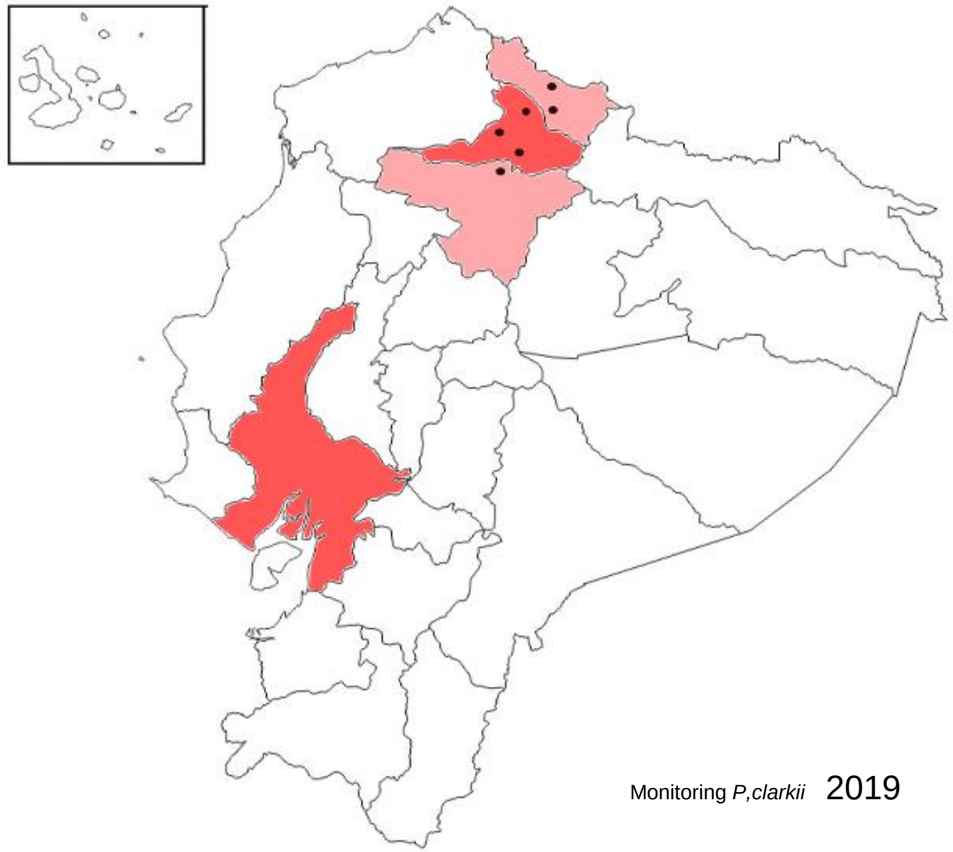
MONITORING 2019

-7 lakes and 12 flow streams
-Methodology Efficacy 100% in comparison with traditional traps



Monitoring *P,clarkii* 2019

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CAUSES OF PROPAGATION

PRINCIPAL:

- interview with local people

  ➔ intentional introduction of *P. clarkii* based on the desire of local **people** to generate touristic alternatives and new gastronomic resources.....

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NEW TECHNIQUE…

Normal:

- 2 hours per sample
- 9 reagents
- Expertise
- 4 Equipments

eDNA

New:

- 15 minutes
- 4 reagents
- Less expertise
- 2 Equipments

Tested in PCR aplications with IAS:

P. clarkii, P. reticulata, C. carpio

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CURRENT WORK...

- IAS
- Andes
- New technique
- *Batrachochytrium dendrobatidis*

eDNA

- Complementing biomonitoring of aquatic environments in the Galapagos with innovative molecular approaches
- eDNA metabarcoding

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CONCLUSION

The results indicate that this budget-friendly method of biomonitoring of aquatic environments is:

- easy to use
- can provide important information on the occurrence of alien invasive species in the tropics

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GRACIAS POR SU
ATENCION

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