

Objectives

The aim of the present bibliographic review is to make a brief compilation of the key aspects for understanding the actual situation about the anthelmintic resistance (AR) in Uruguay and establish a list of possible control strategies to prevent it or stop its development.

Factors that influence the development of AR

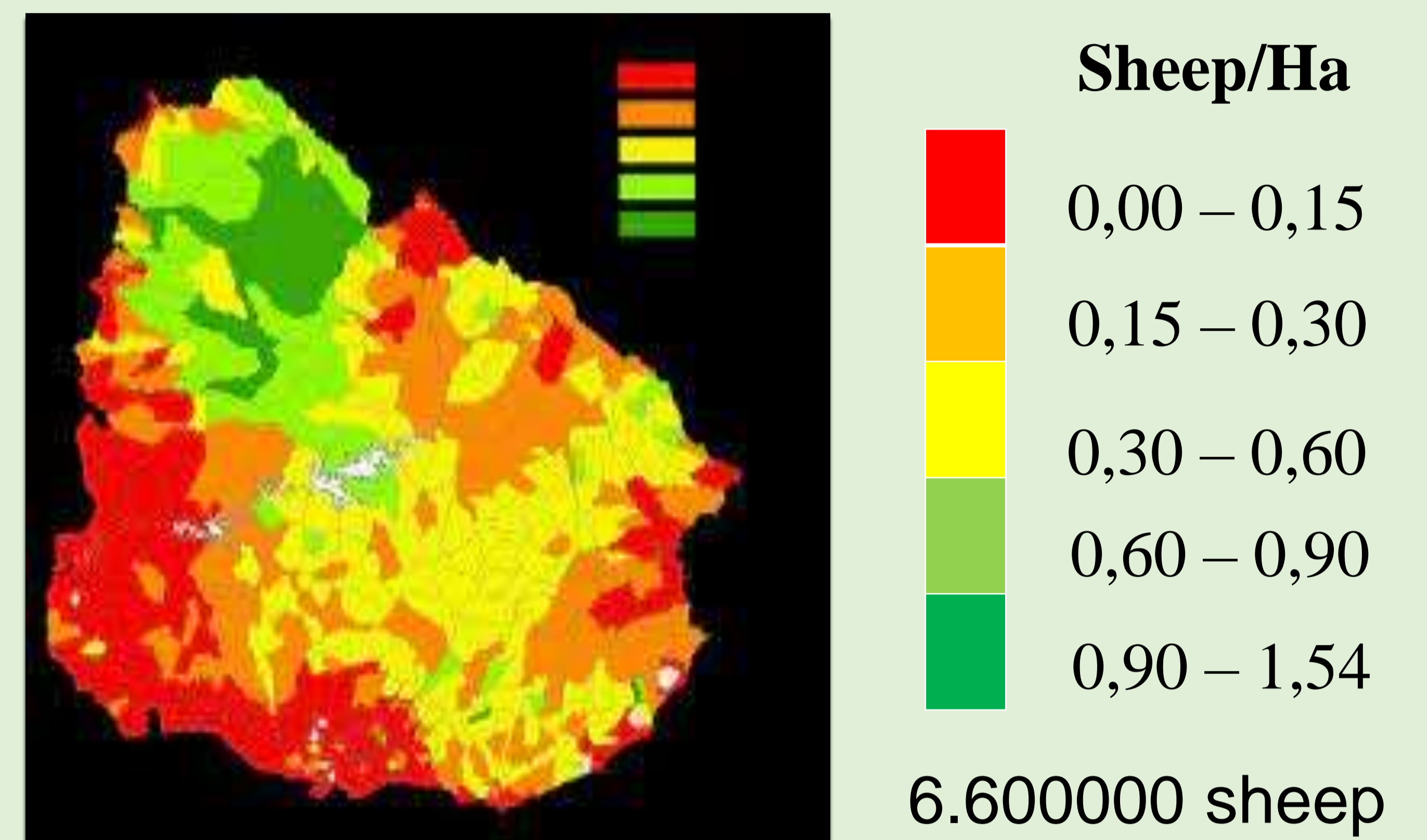
Frecuency of treatments → the higher the frequency, the faster resistance develops. Only the nematodes that survive (resistant) will eliminate their eggs to the pasture, this represents a reproductive advantage and will end up replacing the susceptible population.

Post-treatment reinfestation → if a new infestation does not occur in 3-4 weeks with L3 from the unselected population in the pasture, it will favor the development of AR.

Anthelmintic dose → underdosing due to an error calculating the sheep's weight, or an equipment failure, can contribute an AR development.

Anthelmintic rotation → It was recommended before, but in the present it is a not good measure since the AR is widespread. SCOPS (Sustainable control of parasites in sheep) highlights the importance of integrating drug families, depending on certain circumstances.

Sheep stock

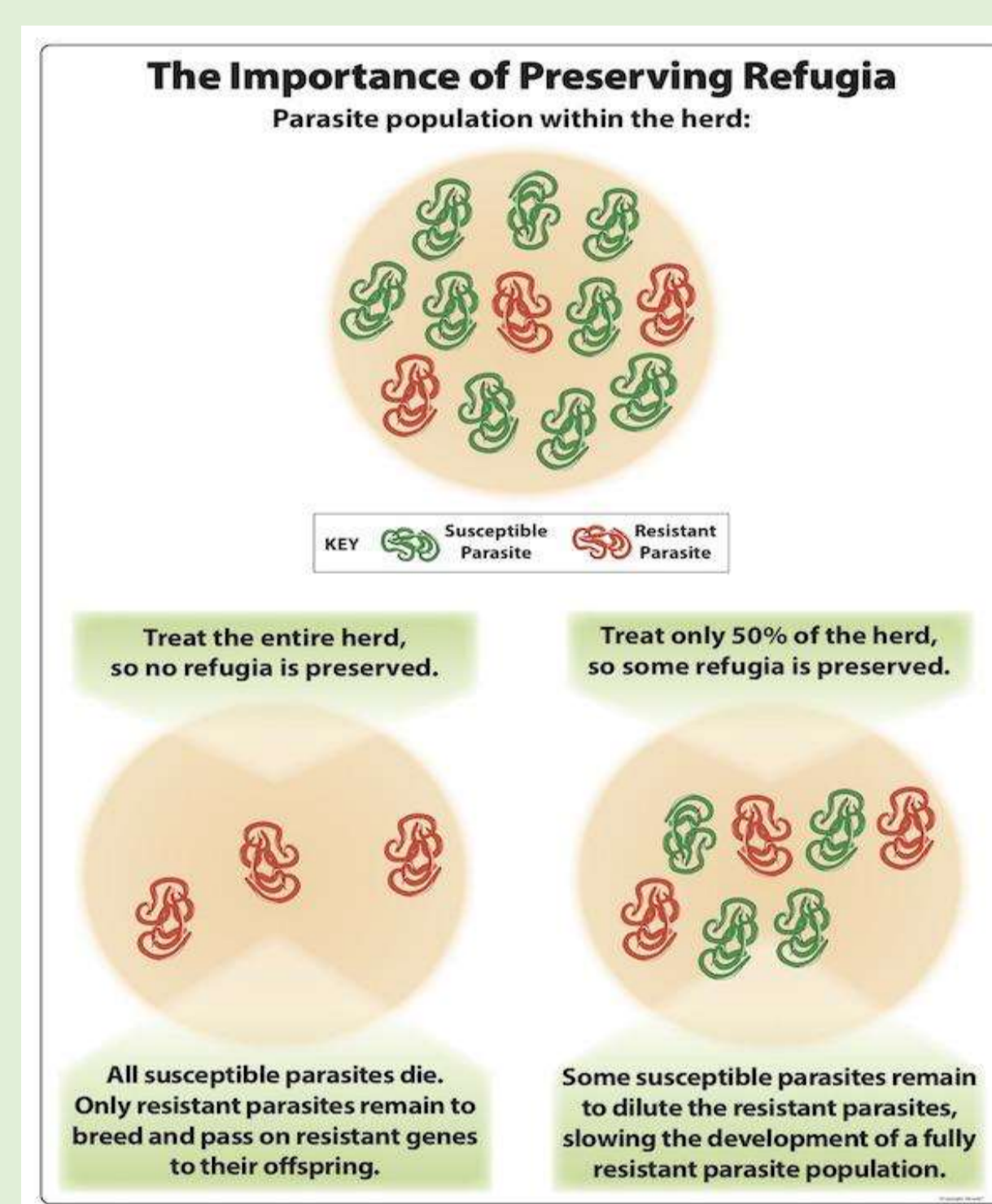


Map 1. Cense of sheep stock in Uruguay 2017 (DICOSE)

Changes in conception

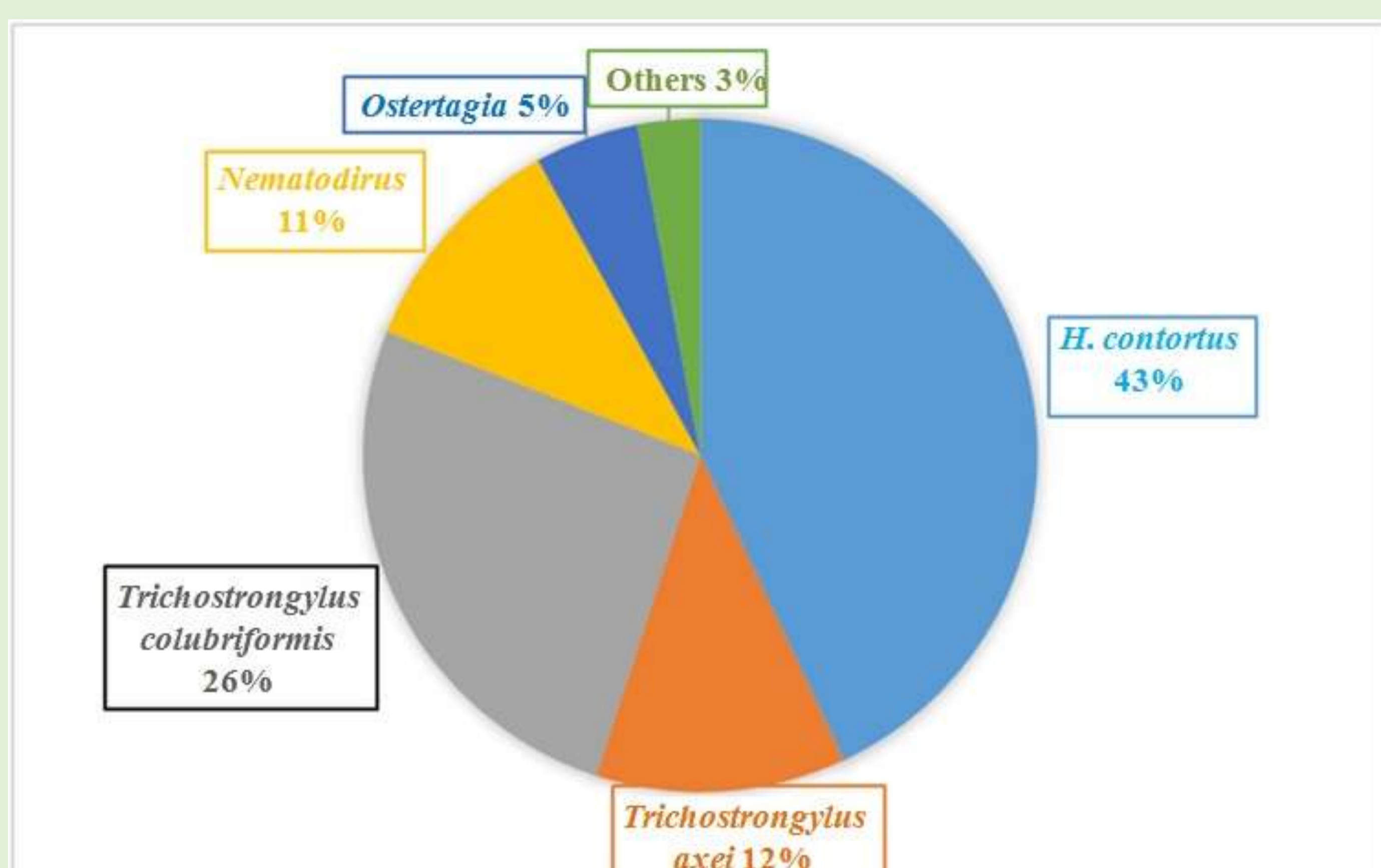
“Clean Fields”

Population in Refugia



Photography 1. Extensive exploitation in Uruguay

Main Nematodes



Graphic 1. Distribution of species of ovine NGI

Image 1. *Haemonchus contortus*
Kingdom of Saudi Arabia, Madinah,
Veterinary Clinic in Agriculture
Department



| | Time of treatment | Possible drugs | Effects of parasitization |
|--------------------------------|-----------------------------------|--|--|
| Herd 1 (breeding sheep) | Prior to service | Closantel (AR → Naphtalophosor Monepantel) | Reproductive disorders: - ↓ ovulatory rate - embryonic death |
| | Prepartum | Moxidectin | Immunosuppression (↑epg in lactation) |
| | Postpartum | Closantel (AR → Naphtalophosor Monepantel) | ↓ milk production |
| Herd 2 (lambs) | Weaning (2,5 - 4,5 months of age) | BZDs (AR → LV o ML) Closantel | Growth deficit |

Table 1. Dosaje plan for the breeding herd

Conclusions

The presence of AR represents a threat to global sheep production and pharmacological treatment remains the main control measure.

The concept of refugia should be considered a priority when carrying out a control plan for gastrointestinal parasites.

Recent methodologies that are still under investigation, such as genetic resistance of sheep, vaccines, use of forages and beneficial microorganisms against NGI, can have a positive impact on parasite control.