

Parasitic worms (helminths) cause severe disease and massive production loss in grazing ruminants. Highly effective and affordable anthelmintics became available from the 1960s and allowed intensification of animal production systems in many parts of the world, and control of helminths using existing scientific knowledge.

Now, the effectiveness of control is breaking down. Anthelmintic resistance (AR) is increasing worldwide in helminths of ruminants, highlighting the reliance of modern food production on chemical control of pests and parasites.

The sustainability of livestock production in grazing systems is under threat, and new scientific solutions are needed.

COMBAR (COMBatting Anthelmintic Resistance in Ruminants) is a COST Action (CA16230) which aims to advance research on the prevention of AR in helminth parasites of ruminants and disseminate current knowledge among relevant stakeholders.

COMBAR aims to integrate, evaluate and assess the economic trade-off of novel developments in the field mainly by networking and has already attracted scientists from more than **33** countries in Europe and beyond.

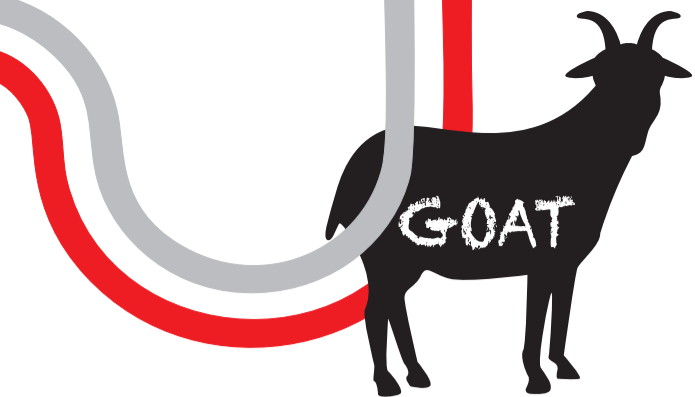


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combating anthelmintic
resistance in ruminants

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The Action is organised around 3 Working Groups (WG):

**WORKING GROUP 1 (WG1)
IMPROVING DIAGNOSIS**

which aims to prioritise, evaluate and implement cost-effective methods for the diagnosis of helminth infections and AR.

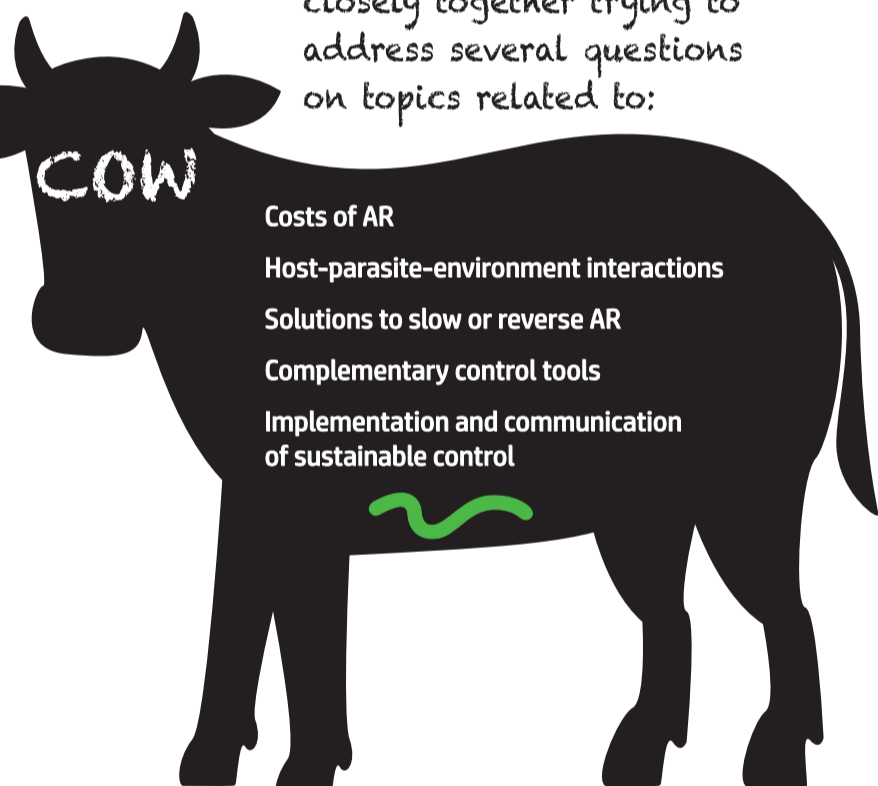
**WORKING GROUP 2 (WG2)
UNDERSTANDING
THE SOCIO-ECONOMIC ASPECTS**

which aims to develop, disseminate and apply methods to study the economics and human behaviour in the field of helminth control in ruminants.

**WORKING GROUP 3 (WG3)
INNOVATIVE SUSTAINABLE CONTROL METHODS**

which aims to develop practical and sustainable helminth control strategies that integrate current insights from diagnostics, Targeted (Selective) Treatment approaches, epidemiology, anti-parasitic forages, vaccinology, farm economics and human behaviour.

WG members are working closely together trying to address several questions on topics related to:



**WG1
IMPROVING DIAGNOSIS**

1. How can the prevalence of AR be practically measured?
2. How can we develop improved and harmonized diagnostics across Europe?
3. How do we apply existing knowledge of the risk factors for AR on farms to effectively slow its development?
4. Can we develop sustainable business models for diagnostics?



**WG2
UNDERSTANDING
THE SOCIO-ECONOMIC ASPECTS**

1. What is the real impact (financial, human and to animal welfare) of AR?
2. What is the economic burden of helminth infections to the European ruminant livestock industry?
3. What factors drive anthelmintic treatment decisions by farmers?
4. What are effective communication strategies of sustainable helminth control approaches?

**WG3
INNOVATIVE SUSTAINABLE CONTROL METHODS**

1. Is resistance, tolerance or resilience the best breeding objective to produce livestock that require less anthelmintic treatment? Under what circumstances should breeders aim for each?
2. Can we enlarge the evidence base of targeted selective control approaches in terms of geography, feasibility and its effect on AR?
3. What proportion of a helminth population must be left in *refugia* in order to slow the development of AR?
4. How can vaccines against helminth infections in ruminants be integrated in control programmes?
5. How do complementary control options interact with synthetic anthelmintic compounds?
6. How can different novel control methods for helminths be integrated effectively and in a way that is simple enough for farmers to implement?

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