

EFFICACY OF A TARGETED SELECTIVE TREATMENT IN DAIRY HERDS AFFECTED BY CLINICAL DICTYOCAULOSIS

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Bovine dictyocaulosis

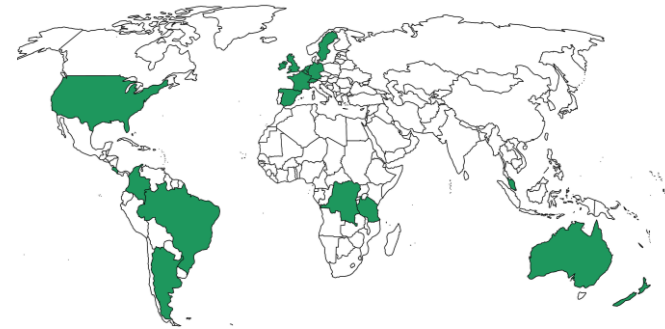
- Dictyocaulosis is a worldwide parasitic disease reported in most temperate country
- Prevalence \approx 80% of herds with enzootic cough in pasture during summer (France, *Lurier et al. 2018*)

- Economic importance

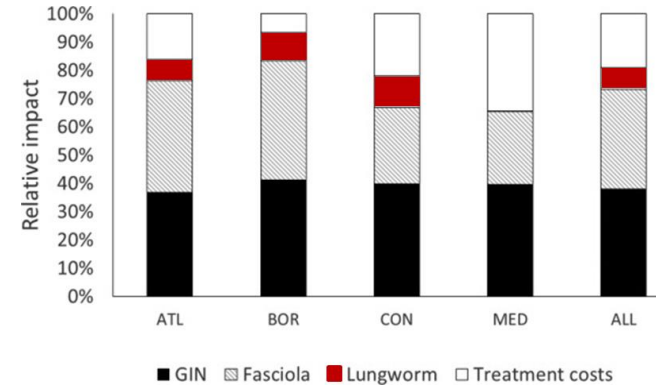
Clinical outbreaks cost = **159-167€/cows** (*Holzhauser et al., 2011*)

⇒ Decreased milk production (30/50% of cost), mortality (30/50% of cost), extra AI + veterinary expense (12-15%)

At EU level : **€ 139 million** [€ 86–225 million] in **cattle** (*Charlier et al. 2020*)



Country with reported cases of dictyocaulosis



Relative economic impact of dictyocaulosis among other parasitic disease according to the climate in Europe

Diagnostic in adult cattle (*Lurier et al. 2018*)

- Routine method : **Baermann / Mc Kenna sedimentation**

Sp = 100%, Se = 7.4%

- **Broncho-alveolar Lavage (BAL)**

- Presence of eggs or larvae :

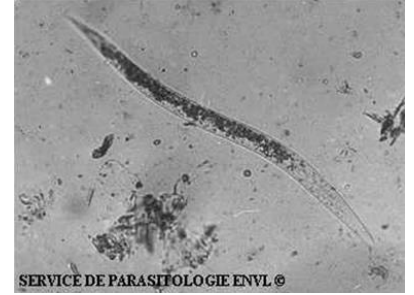
Sp = 100%, Se = 24.7 %

- **Eosinophils proportion > 4.77% in BALF cytology**

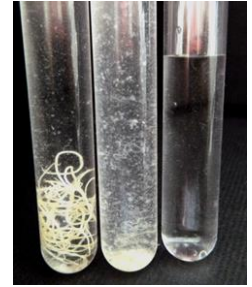
Sp = 85.2% & Se = 85.2%

- **Serology** not available in France, Seuil = 0.389 ODR

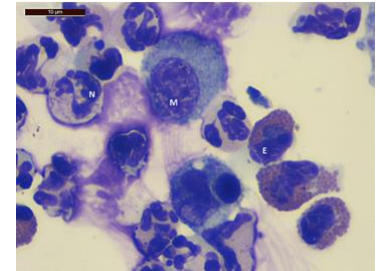
Sp = 85.7% & Se=76.2%



D. Viviparus L3 in feces



D. Viviparus adult in BALF



BALF cytology with eosinophils

Treatment of dictyocaulosis

- Most anthelmintic are effective against *D.viviparus*
 - Very few treatment failure reported : eprinomectine (Rigaud et al. 2019), Albendazol (Coles et al. 2010), Abamectine and moxidectine (Molento et al. 2006)
- Routinely
 - Blanket treatment applied to all cows without confirmatory diagnostic
 - Potential **unnecessary treatment**
 - Potential selection of **anthelmintic resistance** in *D. viviparus* or in other gastrointestinal nematodes
- No **targeted selective treatment protocols** assessed for Dictyocaulosis control in cattle



Pilot study design 1/2

Objectives

- Assess the efficacy of a targeted selected treatment of dairy cattle for :
 - Resolving clinical manifestation of dictyocaulosis in the herd
 - Limit the incidence of the disease in non-treated animal

Methods

- Inclusion of herds with a veterinary dictyocaulosis suspicion in two French regions
- **Confirmatory diagnosis** by bronchoalveolar lavage and Mc Kenna sedimentation
- **Targeted selective treatment of 50%** of the herd with eprinomectine injectable
- **Longitudinal follow up** until 3 month post treatment

Pilot study design 2/2

D0

Diagnostic

Random selection of
6 cows (3
primiparous and 3
multiparous)

BAL,
Individual Mc Kenna
Pooled Mc Kenna

D3-D8

Treatment

Treatment with
Eprecis ND
(0,2mg/kg)

Primiparous
Postpartum cows
Clinically affected
animals

D30

Immediate
follow up

Herd clinical signs according to the farmer

BAL,
Individual Mc Kenna on the 6 followed
cows

Pooled Mc Kenna on 10 primiparous cows

D90

Long-term
follow-up

Rational for treatment

Eprecis ND CEVA (eprinomectine)

- Posology 0.2 mg/kg
- **Injectable** eprinomectine (suitable for selective treatment)
- 2 weeks protection against reinfestation by *D.viviparus*

Treated animals

- Clinically affected (cough)
- **Primiparous** (naive cows => most at risk to amplify the presence *D.viviparus*)
- Post partum cows (until 15 days after calving)

Results : Initial visit

- Only 6 herd enrolled
- Diagnostic positive in 4/6 (66%) herds
 - 1 herd excluded (non-compliance with treatment protocol)
- Animal level prevalence
 - **Primiparous** 6/9 LBA
2/9 Mc Kenna
 - **Multiparous** 1/9 LBA
1/9 Mc Kenna
- Only 1/3 pooled Mc Kenna positive

	Herd	Cows	Eosinophil %	Mc Kenna	Pooled Mc kenna
Primiparous	A	5824	27,75	0	0
		5834	20,75	0	
		5813	4,75	0	
	B	1782	15	1	1
		1808	7,5	0	
		1777	7,5	1	
	C	763	2,5	0	0
		4385	3,5	0	
		769	21,5	0	
	D	8969	0,1	0	0
		2708	0	0	
		4365	0,5	0	
	E	1301	0	0	0
		1465	0	0	
		4627	1,2	0	
Multiparous	A	7064	4,2	0	0
		3493	1	0	
		3489	16	1	
	B	1581	0	0	0
		1565	0	0	
		1642	2	0	
	C	3864	2	0	0
		8525	3	0	
		827	1,4	0	
	D	8670	0,2	0	0
		9912	0	0	
		6277	0	0	
	E	6679	0	0	0
		M3	1,2	0	

Results : Follow-up

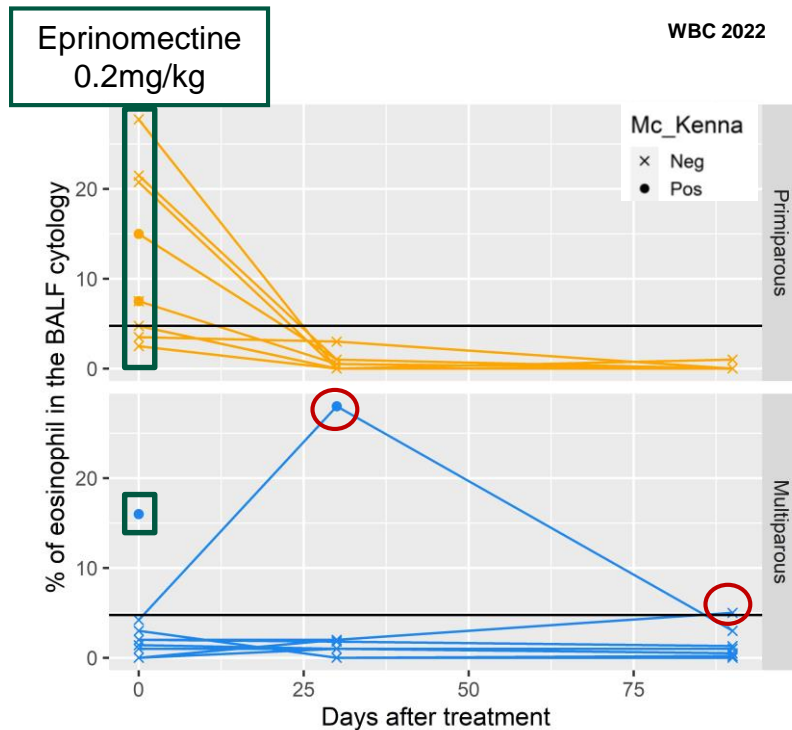
• Primiparous

- All 9/9 primiparous (treated) were negative to LBA and Mc Kenna at D30 and D90

• Multiparous

- 2 excluded cows
 - **1 treated** (cough) replaced by another cows at D30
 - 1 culled at D90
- 2/8 primiparous (not treated) were positive to LBA or Mc Kenna at D30 and D90

⇒ **Incidence rate : 4.4%/month in non treated multiparous
2%/month for all susceptible cows**



Individual follow-up of the BALF cytology (the black line is the positivity cutoff of the eosinophils %)



Clinical follow up : Tachypnea & lung auscultation modification

- **Abnormal clinical examination at D0**
 - 3/9 primiparous
 - 1/8 multiparous
- **During follow-up**
 - Persistence of the **abnormal clinical signs in 2/4** primiparous and **1/1 multiparous**
 - No newly clinically affected cows
- **According to the farmer**
 - **Resolution of the clinical signs in 2/3** herds
 - Persistence of **cough in 1 herd** without needs for supplementary treatments

Discussion

- **Interest of the targeted selected treatment**
 - No re-infestation in primiparous cows
 - No new clinical manifestation after treatment
 - Low incidence (4.4%/month) of *D.viviparus* infestation in non-treated cows
- **Few herds corresponding to the inclusion criteria**
 - Dry weather limiting the contamination of the pasture
 - ⇒ Could have limited the number of lungworm outbreaks
 - ⇒ Could also have favored the good response to the targeted selected treatment
- **Only a proof of concept without control groups**
 - Need to be reproduced with a larger number of herds
 - The targeted selected treatment strategy needs to be compared with a blanket treatment strategy in a randomized control trial

Conclusion and take-home message

- **Importance of the initial diagnosis**
 - 2/6 herds presenting enzootic cough at pasture during summer without dictyocaulosis
 - Confirmation of the higher sensitivity of the bronchoalveolar lavage compared to the Mc Kenna sedimentation in adult cows
- **Potential interest of a targeted selected treatment in dairy cows by treating**
 - Clinically affected animals
 - Primiparous and newly introduced animals
 - Early post-partum cows

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Thank you for your attention



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