Efficacy of a targeted selective treatment in dairy herds affected by clinical dictyocaulosis.

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

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Bovine dictyocaulosis

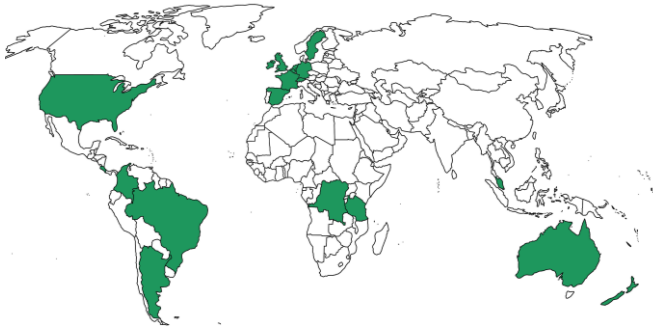
- Dictyocaulosis is a worldwide parasitic disease reported in most temperate country
- Prevalence ≈ 80% of herds with enzootic cough in pasture during summer (France, *Lurier et al. 2018*)

- Economic importance

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

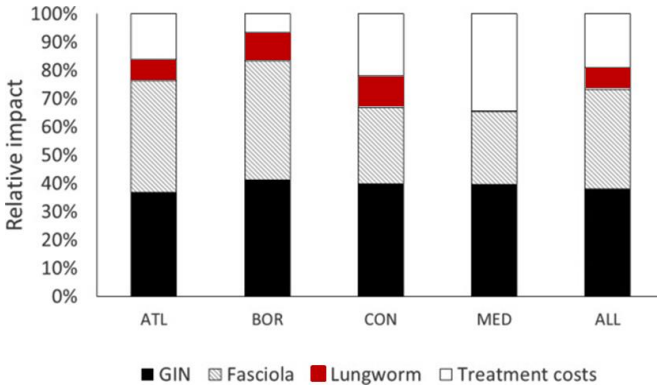
  ⇒Decreased milk production (30/50% of cost), mortality (30/50% of cost), extra AI + veterinary expense (12-15%)

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



(Vanhecke 2021)

***Country** with reported cases of dictyocaulosis*



(Charlier et al. 2020)

***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**

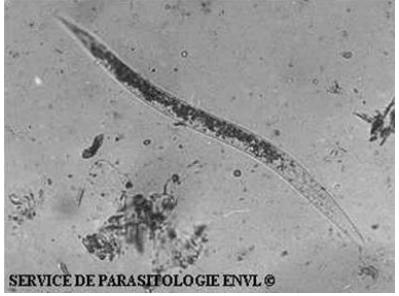
  Sp = 100%, Se = 7.4%

- **Broncho-alveolar Lavage (BAL)**
  - Presence of eggs or larvae :

    Sp = 100%, Se = 24.7 %
  - **Eosinophils proportion > 4.77% in BALF cytology**

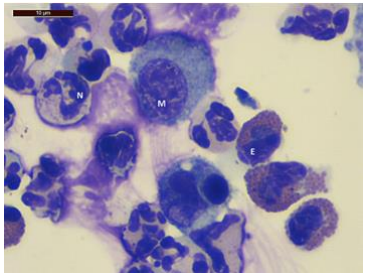
    Sp = 85.2% & **Se = 85.2%**
- **Serology** not available in France, Seuil = 0.389 ODR

  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

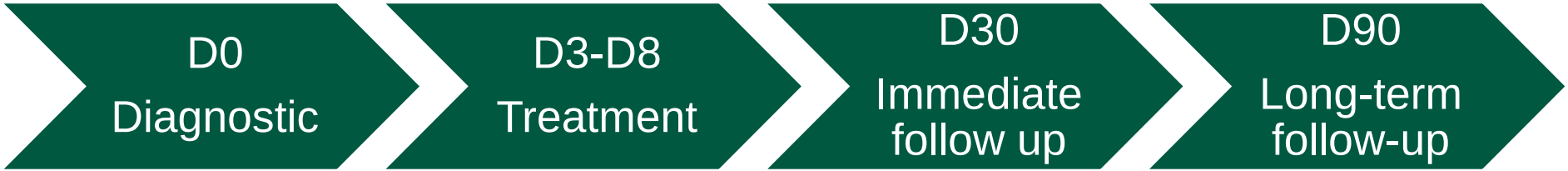
Objectives

- 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



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

BAL,
Individual Mc Kenna
Pooled Mc Kenna

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

Primiparous
Postpartum cows
Clinically affected animals

Herd clinical signs according to the farmer

BAL,
Individual Mc Kenna on the 6 followed cows

Pooled Mc Kenna on 10 primiparous cows

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 portum cows (until 15 days after calving)

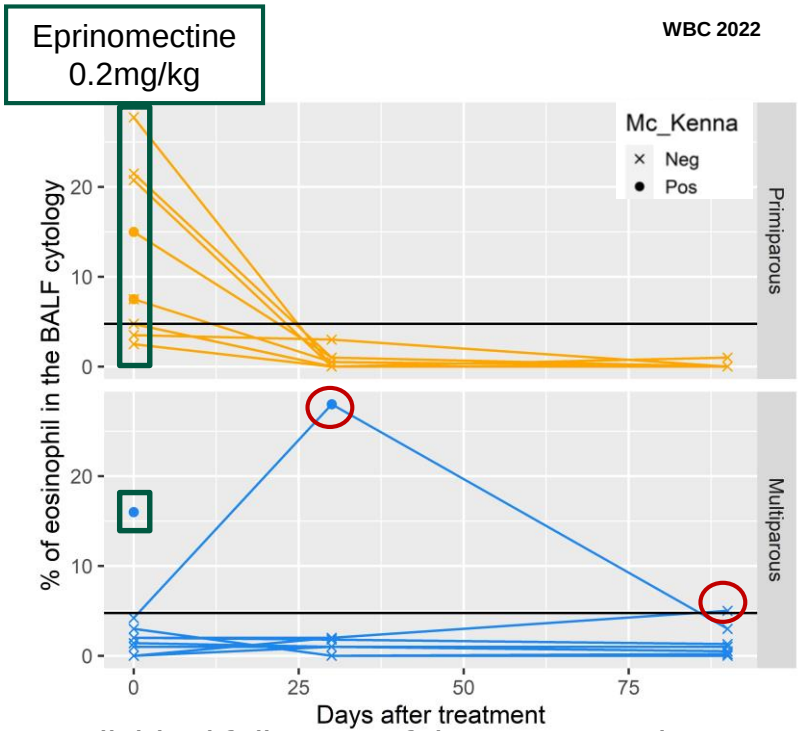
Results : Initial visit

- 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	
		3493	1	0	
		3489	**16**	1	
	B	1581	0	0	
		1565	0	0	
		1642	2	0	
	C	3864	2	0	
		8525	3	0	
		827	1,4	0	
	D	8670	0,2	0	
		9912	0	0	
	E	6277	0	0	
		6679	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



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

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

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

Acknowledgment

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Thank you for your attention

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