

**FOUR HERD VARIABLES ARE ASSOCIATED WITH A HIGH CLINICAL MASTITIS
INCIDENCE IN DAIRY FARMS UNDER INTENSIVE BREEDING CONDITIONS IN
FRANCE**

1. A HIGH % OF WINTER CALVINGS

2. A LOW % OF DRIED COWS RECEIVING ADE VITAMINS

3. HIGH PRECALVING PLASMA CERULOPLASMIN AND GAMMA GT ACTIVITIES

Barnouin J.¹, Chassagne M.

Les variables d'élevage associées à l'incidence annuelle des mammites cliniques ont été analysées à l'échelle de l'élevage-année (n=139) chez des vaches d'exploitations laitières intensives situées en France. Trois déciles d'élevages-année (3x14) ont été comparés par analyse discriminante barycentrique sur un ensemble de variables décrivant le système de production et le statut biologique des vaches. Un faible % de vaches recevant des vitamines ADE, des activités plasmatiques élevées de céruloplasmine et de GGT, ainsi qu'un fort % de vêlages hivernaux sont les 4 variables liées à de fortes incidences de mammites cliniques dans les élevages.

MATERIAL AND METHODS

A herd-year study was designed from an ecopathological survey conducted in French dairy herds to find out variables associated with annual clinical mastitis incidence (CMAI). A total number of 139 herd-years and 100 variables were studied. For each herd-year (1 July-30 June) 2 periods were considered: (a) the last 60 days of gestation (LG); (b) the first 60 days of lactation (EL). Cows were selected on several criteria: a) Holstein breed; b) date of the drying-off for the previous lactation recorded; c) a blood sample collected within the last 6 weeks of gestation; (d) presence in the herd from previous drying-off until at least day 60 of the current lactation. Three groups of herd-years were compared using a previously published method (Barnouin et al., 1995) based on barycentric analysis which allows the determination of the variables which discriminated between groups without making any assumption about type of data. The 3 groups included a top (MA+; CMAI=0 to 5%), medium (MA0; CMAI=12 to 14%) and bottom (MA-; CMAI=26 to 45%) deciles (n=14) of herd-years according to CMAI.

RESULTS AND DISCUSSION

A low percentage of ADE supplemented dried cows (% of explained variation on the discriminant axis [PEV]=9.4%) and high precalving plasma activities of ceruloplasmin (PEV=9.0%) and GGT (PEV=8.2%) were the three LG discriminant variables associated with high CMAIs. A high percentage of winter calvings (PEV=19.9%) was the unique EL discriminant variable associated with high CMAIs (Table 1).

Table 1
Values of the discriminant variables in the low (MA-, n=14), medium (MA0, n=14) and high (MA+, n=14) annual clinical mastitis incidence groups of herd-years (values of the other variables are not shown).

Discriminant variable	Median (minimum-maximum)		
	MA-	MA0	MA+
Late gestation period (LG)			
. Vitamins ADE (% of supplemented cows)	50.0(12.5-100)	31.2(0-62.5)	37.5(0-87.5)
. Plasma ceruloplasmin (oxydasic units)	50.7(48.4-53.5)	51.3(48.2-55.0)	52.0(48.9-55.5)
. Plasma Gamma GT (U/l)	13.9(11.6-42.2)	15.3(12.4-31.1)	16.0(12.0-28.6)
Early lactation period (EL)			
. Winter calving (% of total calvings)	26.5(16.1-44.0)	24.8(15.9-48.0)	33.4(21.4-49.3)

Clinical mastitis risk could be controlled via ADE supplementations (relationships between mastitis and oxydative stress). High GGT activities would depend on *Fasciola hepatica* (Fh) infestation: common environmental conditions (rainfall, moisture, soil conditions) could both favor clinical mastitis and liver fluke infestation and/or Fh could lower immune defense in the cow. Winter calving would be associated with poor hygiene and climatic conditions and subsequent udder infections in the herds. Ceruloplasmin would be a specific predictor for clinical mastitis risk via interrelated nutritional, immune and genetic influences (Chassagne et al., 1997).

REFERENCES

- Barnouin J., Chassagne M., Aimo I., 1995. Dietary factors associated with milk somatic cell counts in dairy cows in Brittany, France. *Prev Vet Med*, 21, 299-311.
- Chassagne M., Barnouin J., Chacornac J.P., 1997. Milk yield, milk protein, plasma ceruloplasmin and GLDH activities as predictors of early clinical mastitis in multiparous Holstein cows. 8th ISVEE Symposium, Paris, 077.

¹ INRA, Unité de recherche d'Ecopathologie, Centre de Clermont Ferrand-Theix, 63122 Saint Genès-Champanelle, France

5