IMPORTANCE OF ENVIRONMENTAL CONDITIONS IN THE PREVENTION OF WEANING DISORDERS IN THE PIGLET, REVEALED BY USING MULTIDIMENSIONAL DATA ANALYSIS METHODS

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The high frequency of weaning disorders in the country, the unsuccessful results of medication and the difficulties of experimental reproduction of the disease have lead to perform an ecopathologic study in conventional affected or non affected herds.
The study in undertaken in Brittany (FRANCE) in a group of 89 piggeries. The number of sows per herd varies from 25 to 250. In each farm the progeny of a few sows farrowing at the same time is observed from parturition to 21 days after weaning day. All the environmental conditions are recorded (feeding level, composition of the diet, piglet weight, housing, management...) and laboratory investigations are made (serological controls...). The data represent 515 variables per herd and computer proceeding methods are used :

- "l'analyse factorielle des correspondances" (BENZECRI 1976), for the main investigations.
- "la classification hiérarchique ascendante" (JAMBU 1978), to get a better interpretation of the results obtained from the previous method.

3 variables are simultaneously considered to compare the herds on weaning disorders ("consecutive variables") :

- mortality occuring during the 3 weeks after weaning
- diarrhoea level occuring during the 3 weeks after weaning
- daily weight gain occuring during the 3 weeks after weaning.

Consequently, the herds are distributed according to a scale of intensity of the weaning problem.
Thereafter, among all the data, except the consecutive ones, the prevalent variables, regularly associated with the disease are selected. They are called causative variables or "risk factors". In order to do this a sequence of analysis (MADEC, JOSSE 1982) is undertaken. The sequence is stopped when the distribution of the observations on the "causative" variables is as close as possible from the distribution obtained earlier on the "consecutive variables".

RESULTS

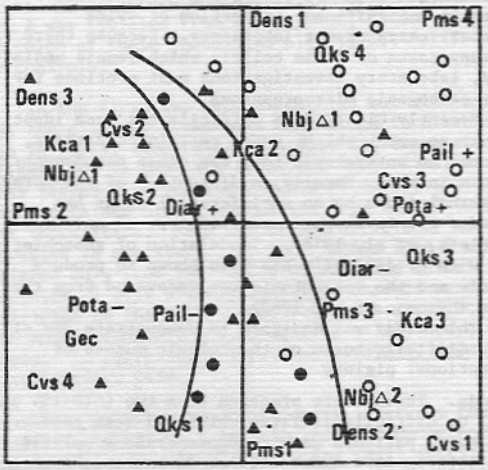
The mortality varied from 0 to 40% among the piglets and the daily gain from 10 g to 400 g. Although the numerous individual situations encountered, it is observed that diarrhoea and mortality are linked and progress gradually as the daily gain is reducing.
Ten conditions are regularly connected with the disease. Each of them is divided into sections and table 1 gives the list of those "causative" factors of the weaning disorders. The effect of a recent episode of T.G.E. in the herds is pointed out. Figure 1 shows the distribution of causative variables and herds on the plane 1-3. So, three areas are defined :
- left : high incidence of the disease
- middle : low incidence of the disease
- right : no problem.

TABLE 1 - PREDISPOSING - CAUSATIVE FACTORS OF WEANING DISORDERS

. piglet weight at weaning	[PMS]	1 to 4
. weight heterogeneity	[CVS]	1 to 4
. feed ingestion (piglet preweaning period)	[QKS]	1 to 4
. feeding level of the sow (pregn + lact)	[KCa]	1 to 3
. temperature fluctuations in the pen (>6°C)	[NBJΔ]	1 to 3
. crowding	[DENS]	1 to 3
. bacteriological pollution of water	[POTA]	+ -
. T.G.E. (less than 6 months)	[GEC]	
. straw bedding at weaning	[PAIL]	+ -
. diarrhoea on suckling piglets	[DIAR]	+ -

FIGURE 1 - DISTRIBUTION OF THE RISK-FACTORS AND POSITION OF THE HERDS

○ : herds with no problem
● : herds with low incidence
▲ : herds with high incidence



DISCUSSION

Each herd is dropped on the map (FIG.1) according to its profile on the causative conditions. On the left area, all the herds have acute weaning disorders, so the variables of that area are called "bad conditions": overcrowding [DENS3], low feeding level of the sow [KCA1] bad control of temperature in the pen [NBJΔ3], pollution of the drinking water [POTA-], high heterogeneity of the piglets at weaning [CVS4], recent T.G.E. episode [GEC]. At the opposite, on the right side, most of the herds have no problem and their weaning conditions are good : [POTA+] [DIAR-] [KCA3]...

The different variables are correlated and they are considered as cumulative risk-factors. More the variables are affected in the bad way or more numerous are those "bad conditions" and more predisposed are the piglets to weaning disorders.

Although it has been demonstrated that a good realisation of all the weaning conditions previously described is not necessary for having correct results. Thus, the model of housing without straw [PAIL-] or early weaning practice (with light piglets [PMS1]) looks like an handicap but the health of the piglets is not impaired if all the other factors are maintained at a right level.

CONCLUSION

The ecopathological study lies on the careful looking of the phenomenons as they appear spontaneously in the herds. When the risk-factors are measured, the herd profile is established and the probability for the disease to occur can be estimated. At once, it is possible to set up the prevention of the troubles by improving the failing factors. The basic data board would be periodically actualized.

SELECTED REFERENCES

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