

## **Electromagnetic waves and disorders in livestock farming**

Arlette Laval (\*), Claude Allo (\*)

Académie d'agriculture de France, 18 rue de Bellechasse, 75007 Paris

Auteurs correspondants : [arlette.laval@wanadoo.fr](mailto:arlette.laval@wanadoo.fr) ; [claudio.allo@orange.fr](mailto:claudio.allo@orange.fr)

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The potential for deleterious effects of electromagnetic fields and low intensity electrical eddy currents on living organisms has been the subject of passionate debate for many years. Interest in this emerged at the end of the 1990s and in recent times has caused an unprecedented media attention resulting in revival of anti-electromagnetic wave activism, public questioning of parliamentarians, public authorities and researchers. The debate was mainly fueled by a few unexplained and unresolved cases that raised suspicion. Mistrust initially centered on very high voltage power lines and then extended to low voltage lines, wind turbines, photovoltaic panels and relay antennas.

The purpose of this session was to review the fundamentals of electrical problems in livestock farming, to present the problems raised, and to highlight the actions considered necessary, particularly in research. There are two major lessons to be learned:

- Electromagnetic fields of all sorts on farm, whatever their origin, are being measured and anomalies can be corrected when their causes are identified.

Animals are more sensitive than humans to electrical phenomena. Above a certain threshold, electrical eddy currents can induce stress on animals and alter breeding performance. The GPSE <sup>1</sup>(1) has developed proven methods of investigation for this in animal husbandry which give convincing results. The attribution of animal disorders can nevertheless be complicated because most of the potential problems encountered in herds are multifactorial. It requires rigorous expertise and a global approach to undertaking electrical, sanitary and zootechnical monitoring and auditing.

We know how to measure electromagnetic fields in livestock farming and we know how to control them. This requires regulatory and electrical operational compliance. Corrective measures are very effective when the cause of any problems is well identified. However, when causes remain unexplained, problems will remain insurmountable.

- The need to undertake new research

New questions arise, linked to changes to the electrical environment marked by the development of new renewable energy sources as well as change to livestock farming. The installation of increasingly powerful electrical equipment in barns and the increasing development of robotics requires ever more electrical vigilance.

Research is also needed to understand unexplained problem cases causing serious disorders that could call into question the sustainability of these new systems. The hypothesis that influence may come from the soil and the subsurface is also unknown or has never been demonstrated. Two lines of research are identified:

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<sup>1</sup> (1) Groupement Permanent pour la Sécurité Electrique en milieu rural = Permanent Group for Rural Electrical Safety.

-Better understanding of electromagnetic fields and currents in different farming situations, their effects on animals, and perception thresholds, including direct (DC) and alternating (AC) currents.

-Study of the circulation of electrical currents in the ground and subsoil, the influence of geology and the possible interference of faults and water circulation with electrical equipment.