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## First steps to build an animal disease management strategy: collective approach to deconstruct problems

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### SUMMARY

The past decades have seen growing sanitary events, strongly affecting animal health and thus questioning the classical ways of designing disease management strategies. Moreover, the growing knowledge on pathosystem dynamics, especially when involving wild fauna, and the tendency of official authorities to delegate the implementation of health policies to regional professional actors, raise important issues on how to design disease management strategies with stakeholders. In Corsica, the Aujeszky disease, caused by a virus shared by domestic pigs and wild boars, has been persistent for the past thirty years with a high prevalence, despite the various strategies designed and implemented. After Continental France has been recognized as free of Aujeszky disease in 2008, French authorities in Corsica have been looking for a way to build an efficient management system in order to eradicate this disease. The partial failure of an experimental plan conducted from 2011 to 2013, led researchers from INRA to propose an experimental participative approach to design a new strategy. This communication aims to present the first results of a round of participative workshops, held in 2015, and involving a large diversity of stakeholders (farmers, official services, veterinarians, animal health farmer associations, regional agricultural chambers, hunters, researchers...). These workshops allowed us to build a systemic representation of the Aujeszky disease problem, integrating its different dimensions (technical, biological, organizational, regulations...) and to create an arena where stakeholders involvement is legitimated through knowledge hybridization processes, enhanced by the collective search of solutions.

### ADDITIONAL KEYWORDS

Aujeszky disease.  
Strategy.  
Participative approach.  
Corsica.

### Primeros pasos para construir una estrategia de gestión de una enfermedad animal: enfoque colectivo para deconstruir los problemas

### RESUMEN

En las últimas décadas se han registrado crecientes acontecimientos sanitarios que afectan fuertemente a la salud animal y cuestionan así las formas clásicas de diseñar estrategias de manejo de enfermedades. Además, el creciente conocimiento de la dinámica de los patógenos, especialmente cuando se trata de la fauna silvestre, y la tendencia de las autoridades oficiales a delegar la aplicación de las políticas de salud a los actores profesionales regionales, plantean cuestiones importantes sobre cómo incluir las partes interesadas en el diseño de estrategias de gestión de enfermedades. En Córcega, la enfermedad de Aujeszky, causada por un virus compartido por cerdos domésticos y jabalís, ha sido persistente durante los últimos treinta años, con una alta prevalencia, a pesar de las diversas estrategias implementadas. Después de que Francia continental se haya reconocida como libre de la enfermedad de Aujeszky en 2008, las autoridades francesas en Córcega fueron buscando una manera de construir una estrategia eficiente para erradicar esta enfermedad. El fracaso parcial de un plan experimental llevado a cabo de 2011 a 2013, llevó a investigadores del INRA a proponer un enfoque participativo experimental para diseñar una nueva estrategia. Esta comunicación pretende presentar los primeros resultados de una ronda de "workshops" participativos, realizados en 2015, con una gran diversidad de actores (agricultores, servicios oficiales, veterinarios, asociaciones de productores agropecuarios, cámaras agrícolas regionales, cazadores, investigadores...). Estos "workshops" nos permitieron a construir una representación sistémica del problema de la enfermedad de Aujeszky, a través de sus diferentes dimensiones (técnica, biológica, organizativa, normativa...) y crear un espacio donde la participación de las partes interesadas se legitime a través de procesos de hibridación del conocimiento, potenciados por la búsqueda colectiva de soluciones.

### PALABRAS CLAVE ADICIONALES

Enfermedad de Aujeszky.  
Estrategia.  
Enfoque participativo.  
Córcega.

### INFORMATION

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### INTRODUCTION: WHY CAN'T WE GET RID OF AUJESZKY DISEASE?

Aujeszky disease (AD) is a wide European animal health problem, and several countries have been struggling to control and eradicate the disease for decades.

During the 1960-70's, AD spread progressively in pig farms, because of the intensification of farming systems and the increase of commercial exchanges (Pejsak & Truszczynski 2006). In countries officially free from the disease, wild fauna is still considered as a potential source of recontamination (Muller et al. 2010; Pol and

Lepotier 2011; Hars et al. 2013). Continental France was recognized as free of AD in 2008 (European Commission, decision 2008/185/CE), after struggling for more than 20 years (Bronner 2009), and the vaccination strategy was replaced by a surveillance protocol (slaughter of positive pigs).

But the island of Corsica was not included in the European Decision. Because of the failure of eradication strategies (implemented since the 70's), AD is considered as endemic on the whole island. In Corsica, pig production is characterized by extensive outdoor systems, partly relying on pasture resources (acorn and chestnut pastures), using local and common breeds ("Nustrale" pigs, "Large White" or "Duroc"), and valorizing production on several types of market (Product Designed with Origin with high added-value, direct selling and "classical" markets). Domestic pigs share land resources with wild fauna and are thus in epidemiological interaction (Casabianca 1989; Relun et al. 2015). In 2009, when Animal Health Services proposed to continue a massive vaccination strategy on the Corsican territory, the National French Sanitary Agency (AFSSA) argued that these farming conditions were not fit to achieve an eradication process (AFFSA 2009). Despite this answer, local authorities did not give up, and set up an experimental plan to test the feasibility of vaccination in Corsican farming situations. Implemented during 3 years (2011-2013), this plan partially failed: the results on seroprevalence were considered as satisfactory (seroprevalence decreased from 31.1% in 2011 to 8.6% in 2013, almost one-third of the farms having eradicated the disease) but one-third of the farmers participating to this plan withdrew before its achievement. As a consequence, no massive vaccination campaign, or management strategy has been decided since the end of the experimental plan.

So despite a powerful tool (vaccine), stakeholders seem to be unable to build a relevant collective strategy to get rid of AD. This article presents preliminary results from a participative approach, conducted in a research-action perspective (Casabianca & Albaladejo 1997), which purpose is to collectively design a new strategy in Corsica, by engaging stakeholders as designers (Bjögvinsson et al. 2012). Indeed, the AD case appeared to be a good case study because of constant failure of AD eradication strategies in Corsica (Health authorities hence appearing powerless to deal with this disease). We present here the results of a first set of collective workshops, which aimed at making stakeholders to collectively formulate the lock-in effects (problems) and the potential solutions to address the Aujeszky disease situation in Corsica.

#### MATERIAL AND METHODS: PARTICIPATIVE WORKSHOPS

Our participative process was constituted by three stages. As the results from stage 2 are the object this paper, we propose not to rapidly present methodology and objectives for stage 1 and 3, and to insist on methodology and objectives in stage 2:

Stage 1: we conducted an ex-post analysis of the experimental plan (evaluation of the results, feed-backs from stakeholders), to assess the difficulties encountered when the plan was implemented in Corsica. One objective of this work was to identify main themes to be discussed in participative workshops.

Stage 2: we implemented three collective workshops to formulate problems encountered in managing AD situation in Corsica. Each workshop was about a specific subject: 1. Feedback on previous experiences, 2. How to coordinate vaccination on Corsican territory, 3. How to deal with wild boars. Debates in each workshop were organized according to different sub-themes (e.g.: the type of animal to be vaccinated on the farm, or the procedure to provide vaccines to veterinarians). Using results from stage 1, stakeholders were brought to discuss on a large diversity of themes by mean of the three workshops. For example, as the implementation of serologies to monitor the progression of vaccination was reported to be problematic (time consuming, secondary effects due to manipulations...) it constituted a sub-theme in workshop 2. Stage 2 was named "deconstruction stage" as it aimed at making participants to "dissect" the Aujeszky situation and to formulate the diversity of problems and possible solutions.

Stage 3: three collective workshops were implemented to co-construct a new strategy.

A large panel of participants was invited: farmers (5), hunters (2), national park manager (1), veterinarians (1), state authorities (2), FRGDS<sup>1</sup> (2), pig breed management association (2), a technician from INRA, and an external expert from French Sanitary Agency (1).

Animation of the workshops was provided by researchers from INRA (debate facilitation, workshop organization). Discussion were recorded, with the acknowledgement of participants, in order to provide data to be analysed. The data were constituted in order to identify types of problem and solution discussed around the table and to identify the connexion between problems. To clearly illustrate our findings, we chose to present some results from workshop 2 (vaccination theme). The sub-themes of this workshop were:

1. The modalities to vaccinate (which type of animals, which period, who can vaccinate, how to organize vaccination operations...);
2. Which measures to be implemented to create good conditions for vaccination (animal identification, serologies to monitor...)?
3. How to secure the supply of vaccines (who must order vaccines, what are the possibilities regarding to legislation...)?
4. Is it relevant to vaccinate wild boars and how?

<sup>1</sup>FRGDS : Fédération Régionale des Groupements de Défense Sanitaire du Bétail. A farmer association who support farmers on health issues, by implementing surveillance or management strategies on non-regulated diseases.

RESULTS: A COMPLEX SYSTEMIC ISSUE

A large diversity of problems were discussed about the issue of vaccination. Table I shows results about the deconstruction of the vaccination theme in different problems. Talking about how we should vaccinate in Corsican pig farming systems brought participants to wider the discussion area. The availability of vaccine was a major issue, as France was officially declared free of AD in 2008 (how to justify the importation of the vaccine that is not produced in France?). Discussion on good practices, to avoid vaccine waste (maintaining the chain of cold for example) was an emerging problem. Several debates took place, concerning the good conditions to vaccinate (period, type of animal and access to the animals for the operator). At last, the question of the coordination of vaccination operations brought a discussion about the scale of intervention and the possibility to involve farmers in areas where veterinarians are not present. Hence, these debates allowed us to extract the different sub-issues on vaccination theme, as a first set of results.

Our second set of results concerns the characterization of each sub-issue regarding to the different dimensions of the problem. We identified 4 types of dimension (**Table I**): Regulatory, Technical, Organizational and Financial.

Regulatory dimension: mainly brought by State authorities, FRGDS and sometimes veterinarians. This dimension concerns several sub-issues. For example, to vaccinate all farms, the regularization of unofficial producers is compulsory (impossibility to allow them to

be beneficiaries of a public strategy). Also, to authorize farmers to vaccinate (and not veterinarians) requires an official control procedure involving a third party who must be qualified.

Technical dimension: mainly brought by farmers and veterinarians. We discussed about the lack of equipment (containment corridor) and the difficulty to gather the herds and to contain the animals to be vaccinated (a problem for operators as they spend time and energy to vaccinate all the animal on the farm). Also, only a few of veterinarians in Corsica are qualified on pig sector: unexperienced veterinarian doing vaccination and serologies can lead to damages on the animals (stress, infections), with consequences on the farm production

Organizational dimension: brought by the whole participants. There were major issues concerning the coordination of a vaccination operations at the Corsican scale, especially because many small farms are not well identified. Moreover, because of the lack of qualified veterinarian in some areas, information cannot be transferred between farmers and authorities. Also, as animals are available on a short period around the farm (pastoral system), the time window to vaccinate all animals in all farms is too short.

Financial issues: brought by several stakeholders. State authorities pointed out the need to build a collective strategy, validated by authorities, to make the vaccination operations free of charges for farmers; the lack of containment infrastructure in farms, pointed out by the FRGDS, rose the need of collective purchase (fences) as one farmer cannot support the cost alone.

**Table I.** The different issues regarding the vaccination theme (Los diferentes problemas concernientes a la temática de la vacunación).

Sub-issues	Dimensions			
	Regulatory	Technical	Organizational	Financial
Vaccine availability	Necessity of a collective action, authorized by French Sanitary Authorities to justify the importation of vaccine		Veterinary order or State authorities	collective action to get the vaccine free
Vaccine use		Avoid vaccine wastes (good practices)		
To vaccinate all farms	Necessity to identify and regularize unofficial farms		Time vs resources Unidentified farms lack of farmers involvement	Operators equipment insufficient
Which animal to vaccinate?		Lack of equipment to vaccinate all type of animals	Time and organization	More expansive if fattening pigs are included
Who vaccinate	Authorizing farmers to vaccinate if a third party controls	Lack of competencies on pigs (vets) Pigs manipulation	Lack of vet	
Which period for vaccination?		Access to animals Timing of vaccine effectiveness	Time spent by vets to visit on farm in mountainous area	
Access to animals		Difficulty to gather the herd	Period of unaccessibility (animal on pastures in autumn)	Lack of containment infrastructure in farms



## DISCUSSION: WHY DO WE FAIL?...

Our results highlight the complexity of a disease management situation and, by showing the systemic nature of the problem, gives important clues to build a management strategy. Indeed, we showed that for vaccination issues, the problem is wide and concerns all the stakeholders (e.g. getting containment equipment concerns farmers associations; vaccine importation concerns public authorities, the need for formation on pig vaccination concerns veterinarians...). Moreover, solving one problem in particular will not be sufficient and a management strategy will require to proceed step by step and to prioritize operations in order to create good conditions of realisation (e.g. to identify unofficial farms is compulsory before launching vaccination operations). Hence, our participative approach showed that each issue is to be clearly identified of formulated by stakeholders before being addressed in a coherent strategy. It thus raises questions about how we design disease management strategies, and calls for collective approach in strategy designing process.

Disease management strategies are, in France, mainly elaborated by specific services in collaboration with sanitary veterinarian, especially for regulatory diseases, such as AD. The AD situation in Corsica is a relevant case to be studied in order to understand how the implementation of disease management strategies face major difficulties that are due to several dimensions of territory characteristics (lack of veterinarians, technical deficiencies, strict regulation...). Our results give an explanation about why disease eradication strategies are likely to fail if strategy designers do not take into account the complexity of the system and stakeholders knowledge. Indeed, considering the growing societal questioning of disease management strategies (especially regarding sanitary crisis like the blue tongue virus, avian flu or foot and mouth disease epizooties in Europe), our results show that participative approaches are useful, especially via the expression of knowledge on different themes and issues, even on subjects of which some of the participants are not considered as experts (e.g. : farmers bringing relevant thoughts and solutions on the coordination of vaccination operations). Such participative approaches can bring participants to go beyond their "classical" area of expertise and to question recognized experts (Callon et al. 2001). In this perspective, by collectively deconstructing the AD situation, we experienced the collective construction of problems to be addressed. As a consequence, each participant to this approach has been legitimated to participate the stage 3 of our work, the design of a new Aujeszky disease management strategy.

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