



The veterinary profession: an asset to the bee-keeping sector

N. Vidal-Naquet ⁽¹⁾ & C. Roy ⁽²⁾

(1) Doctor of Veterinary Medicine, graduate in bee-keeping and bee diseases (DIE), Chair of the Federation of Veterinarians of Europe (FVE) Working Group on Honey-Bee Health (since 2012)

(2) Doctor of Veterinary Medicine, graduate in bee-keeping and bee diseases (DIE), Chair of France's national society of veterinary technical groups (SNGTV) Bee-Keeping Committee (since 2009)

The designations and denominations employed and the presentation of the material in this article do not imply the expression of any opinion whatsoever on the part of the OIE concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries.

The views expressed in this article are solely the responsibility of the author(s). The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by the OIE in preference to others of a similar nature that are not mentioned.

Keywords: apiculture – *Apis mellifera* – bee keeping – farm health audit – honey bee – veterinary education – veterinary profession.

« ... Sed si quem proles subito defecerit omnis nec genus unde nouae stirpis reuocetur habebit, tempus et Arcadii memoranda inuenta magistri pandere quoque modo caesis iam saepe iuuentis insincerus apes tucrit cruor... »

'... But if someone's whole brood has suddenly failed, and he has no stock from which to recreate a new line, then it's time to reveal the famous invention of Aristaeus, the Arcadian master, and the method by which in the past the adulterated blood of dead bullocks has generated bees...'

Virgil, *Georgics*, Book IV–285

(Translation: A.S. Kline)

The honey bee, *Apis mellifera*, has always held a special place in people's lives: a source of honey and other products, its role in pollination has also made this creature crucial to the agricultural economy.

The veterinary profession has taken very little interest in this domestic species because bee health has long been trouble-free. The first jolt, in the form of the global *Varroa destructor* pandemic in the 1980s, coupled with the even more severe health crisis that began at the turn of the century, causing increased mortality worldwide, call for the involvement of a range of bee-keeping stakeholders together with the animal health professional.

As the veterinary profession is specially trained in the areas of clinical examination, diagnosis, pharmacology and safety, and is responsible for both animal and public health, as well

as within the framework of the 'One Health' key concept¹, it can and must be called upon to intervene in various areas of bee-keeping, in particular:

- bee health (which includes animal protection and welfare)
- food safety (as honey is considered a food of animal origin)
- scientific research
- laboratory diagnosis
- education of veterinarians and bee health workers
- in a broader context, the preservation of the environment and biodiversity.

France's National Veterinary School of Nantes (ONIRIS), jointly with the National Veterinary School of Alfort (EnvA), has developed a postgraduate degree in bee-keeping/bee diseases for veterinarians, including practitioners, to address the current crisis. It aims to provide veterinarians

¹ One Health: www.onehealthinitiative.com



with a specialisation in bee diseases through theoretical and practical training (biological and husbandry basics of bee-keeping; the organisation of the sector and its economy; bee pathogens and diseases; farm health audits; health and drug regulations)². In addition, in 2009, France's national society of veterinary technical groups (SNGTV) established a Bee-Keeping Committee, bringing together veterinary practitioners working in the field who are trained in bee diseases. The committee acts as a focal point for bee health and technical authorities³.

At the European level, in 2012, the Federation of Veterinarians of Europe (FVE) established a Working Group on Honey-Bee Health, which has recommended the expansion of bee-keeping veterinary education for students and veterinarians to include the veterinary profession's role in bee-keeping and veterinary drugs in bee medicine. These recommendations are available on the FVE website⁴.

Examination, diagnosis, treatment, prevention

The veterinarian's role in bee-keeping, as with other animal species, focuses on prophylaxis and on managing colony health disorders. The concept of **bee health disorders** includes diseases caused by both biological hazards (viruses, bacteria, parasites) and chemical hazards (poisoning), which should not be separated.

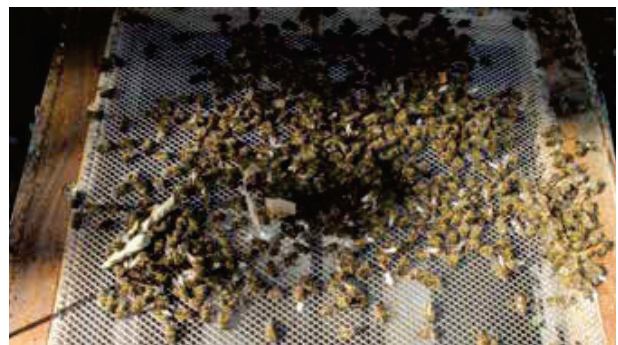
Veterinary medical intervention, based on scientific training, is a four-stage process: clinical (Fig. 1) or post-mortem examination and, if necessary, conducting additional tests, making a diagnosis and prescribing treatment (including the establishment of a control programme).

A veterinarian's intervention in the case of acute health disorders will ensure that a **coherent scientific clinical approach** is used to deal with medical problems, resulting in a diagnosis. Diagnosis is the outcome of a process learned and assimilated by practitioners (working with any species) on the basis of medical history, clinical signs, epidemiological evidence and possible information from additional tests (Fig. 2). An apt example is the exceedingly effective intervention of a veterinarian [1] in the face of abnormal mortality among bees in the French prefecture of Ariège in 2009, when she diagnosed permethrin poisoning and alerted the health authorities [2]. A coherent scientific clinical approach enables animal health measures to be



© N. Vidal-Naquet

Fig. 1
Clinical examination of a bee colony



© N. Vidal-Naquet

Fig. 2
Abnormally high mortality in a colony requires the intervention of a veterinarian specialising in bee diseases

taken (e.g. bee-keeping techniques) for treatment or prevention, such as sanitation and disinfection, as well as the transfer, or even destruction, of bee colonies. It may also enable veterinary drugs to be prescribed when they are authorised.

The use of veterinary drugs in apiaries is a case apart, due to the nature of *Apis mellifera*, its biology and products. Before using therapeutics in hives, consideration must be given not only to the disease being treated or prevented but also to local legislation on the protection of animals, humans and the environment. The risk of veterinary drug residues in hive products, especially honey, is a key factor in prescription.

2 Inter-Veterinary School Diploma or DIE: www.oniris-nantes.fr/professionnels/formations-continues/formations-diplomantes/

3 France's national society of veterinary technical groups: www.sngtv.org

4 Federation of Veterinarians of Europe: www.fve.org

In France, medical prescriptions are required only for *Varroa* parasite control. The prescription of antimicrobials and antifungals is highly questionable on scientific and public health grounds [3, 4]. However, in countries authorising the use of antimicrobials and antifungals (e.g. Canada and the United States), prescription by a veterinarian should be made mandatory and should take into account the risk/benefits for colony health as well as public health (antimicrobial resistance, residues, etc.). Leaving beekeepers free to decide whether to use them is extremely risky for both colonies and public health [5].

Overview of bee-keeping: farm health audits and assessments

Veterinarians play a crucial role in chronic disorders. Their training and expertise enable them to conduct farm health audits to pinpoint any aspect of beekeepers' health practices and apiary management that is likely to impair colony health.

Bee-colony health relies on a balance of several factors: bee characteristics (genetics, natural resistance); microbial build-up on the farm; food resources; chemical environment, which exposes bee health to constant stress; weather conditions; climate; the apiary; and overall management (bee-keeping practices); in particular, the management of diseased colonies. Health disorders in bees, as in other farmed species, are rarely the result of a single factor, and environmental changes call for good bee health management practices.

Farm health audits assess the health of apiaries, as well as making a risk assessment and analysis of bee-keeping practices (Fig. 3). These assessments help in considering and proposing appropriate measures. The proposed measures are then reassessed during a return visit.

As veterinarians specialising in bee diseases are trained to carry out farm health audits, they may also act as experts for the health authorities as well as in legal and insurance matters [6].

Epidemiological surveillance and animal health measures

In France, a number of veterinarians specialising in bee diseases are taking part in a pan-European epidemiological study on honey-bee colony losses (EPILOBEE³), to which they are making a major contribution.

As part of their remit as private veterinarians with an animal health accreditation mandate (*vétérinaires sanitaires*), veterinarians specialising in bee diseases play a key role in alerting and informing the health authorities of suspected or actual cases of poisoning or high-grade health hazards, as well as in helping to make health decisions.



Fig. 3
A farm health audit identifies risky bee-keeping practices (such as risks from the siting of hives)

Veterinarians and public health

Like other farm animals, bees are bred for their products. What makes the bee special is that it is the only species whose feeding cannot be controlled. Being a foraging species, it suffers the effects of environmental degradation and its products may become contaminated with xenobiotic residues (plant protection products, veterinary drugs, heavy metals, etc.). As professionals responsible for veterinary public health (foods of animal origin), all veterinarians, whatever their position (practitioner, researcher, laboratory diagnostician or official veterinarian), have a major role to play in protecting consumers and, ultimately, bees and the environment.

5 A description of EPILOBEE network is given on p. 69

Official veterinarians

Official veterinarians perform a variety of tasks, including: health and epidemiological surveillance of bee populations and the trade in animals; health decision-making for government-regulated diseases and the implementation of relevant measures; the implementation of regulations for controlling occurring or potentially occurring regulated diseases (such as *Aethina tumida* and *Tropilaelaps* spp. in Europe); health monitoring of honey production, distribution and importation within the Veterinary Service's remit for hygiene in the animal-derived foodstuffs sector.

Conclusion

Veterinarians are a major asset to the bee-keeping sector and, as in other value chains, the 'One Health' concept provides a basis for cooperation among all current and future stakeholders in the bee-keeping sector. The ONIRIS curriculum for veterinarians, agronomists and apiary technicians is therefore designed to optimise relations among professionals:

a) between beekeepers and agronomists, for agronomy-based good bee-keeping resource management (advice on resources, risky pollen and nectar flows, production of single-flower honey, etc.);

b) among beekeepers, apiary technicians and veterinarians, for good health management. When an anomaly occurs in their hives, beekeepers are the first to sound the alarm, as are farmers in other sectors; veterinarians identify the problem (diagnosis followed by advice, treatment and/or prophylaxis) and rely on technicians to help introduce measures and support beekeepers;

c) between veterinary practitioners and health authorities: veterinarians can support the administration by implementing the required animal health measures for regulated diseases, inspecting foodstuffs, etc.

As veterinary practitioners have become involved only recently, some beekeepers may be reluctant to contact a veterinarian. It is to be hoped that the veterinary profession and veterinary schools around the world will organise to train students and veterinarians to make their professional expertise available to beekeepers (Fig. 4).

As veterinarians specialising in bee diseases are trained in diagnosis, treatment, animal health measures and veterinary public health, they are a major asset in our current times of crisis. They would seem to be ideal partners.



© N. Vidal-Naquet

Fig. 4
Students from France's National Veterinary School of Alfort learning about bee diseases

References

- Vidal-Naquet N. (2009). – Les antiparasitaires utilisés pour lutter contre la FCO sont suspectés d'intoxiquer les abeilles. *Sem. vét.*, **1349**, 22.
- Vilagines L. (2009). – Lettre d'une consœur aux services vétérinaires mettant en garde sur les probables méfaits environnementaux des insecticides utilisés dans la lutte contre la FCO. Available at: www.apivet.eu/2009/02/lettre-dune-consoeur-aux-services-v%C3%A9t%C3%A9rinaires-mettant-en-garde-sur-les-m%C3%A9faits-environnementaux-des.html (accessed on 18 March 2014).
- Vidal-Naquet N. (2011). – Honeybees. In *Invertebrate medicine* (G.A. Lewbart, ed.), 2nd Ed. Wiley-Blackwell, Oxford, 285–321.
- Federation of Veterinarians of Europe (2013). – Veterinary medicinal products for honeybees. Available at: http://fve.org/uploads/publications/docs/009_bee_wg_vmpps_october_2013.pdf (accessed on 17 March 2014).
- Ohio State Beekeepers' Association (2014). – Antibiotics for American and European foulbrood disease. Available at: www.ohiostatebeekeepers.org/resources/ohio-fact-sheets/antibiotics-for-american-and-european-foulbrood-disease/ (accessed on 19 March 2014).
- L'Hostis M. & Barbançon J.-M. (2013). – Conception et intérêts des audits sanitaires en apiculture. *In Proc. Journée Scientifique Apicole 2013*, 11 October, Aix Les Bains, France, 79–87.