

## Control measures

Following the first detection of the H5N8 HPAI virus, measures including the enhancement of biosecurity were promptly enforced throughout the European Union, providing mandatory action to be performed, including the obligatory indoor housing of poultry, the ban of poultry markets, and increased controls on biosecurity implementation to reduce direct or indirect contact with wild birds in the domestic poultry (Pohlmann et al., 2017). Similarly, on 9 November 2016 the Italian Ministry of Health issued an urgent provision aimed at: (i) strengthening the control activities on biosecurity measures, in particular to verify the application of effective separation between poultry and wild bird, (ii) enhancing the monitoring of wild birds with possible AI infection, (iii) raising awareness on the importance of early reporting suspected cases. Besides these general measures, after the first H5 HPAI detection in Italy, further control measures to be implemented at a National level were provided in the Ministerial provision of 30 December 2016, including: (i) the ban of the use of live decoy birds; and (ii) sampling of turkeys, laying hens, fattening ducks and geese during the official inspection performed to verify the implementation of biosecurity measures.

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## Beekkeeping: a common good to be protected tenaciously

### The health emergency

In last decades beekkeeping was affected by a series of health emergencies that heavily influenced beekkeeping businesses. **New parasites** spread out as a result of trade and movements at intercontinental scale, while infectious diseases already known, occurred at a level of expansion and unexpected gravity. The recent phenomena of



Figure 1.  
Mortalities of bees on newspaper

mortalities of bees, to which the mass media gave great resonance (Figure 1), are the most striking evidence of a process of decline of bee health also due to environmental changes related to human activities (Carpana, Lodesani, 2014). From the autumn 2006, some beekeepers in the United States reported losses of bee colonies from 30 to 90% with symptoms not due apparently to known pathogens. Because of the severity of this phenomenon, combined with continuously detected symptoms represented by a gradual depopulation of beehives, the scientific community of the United States called the new phenomenon “**Colony Collapse Disorder**” or **CCD** (Ellis et al., 2010). Subsequent studies showed that the cause of the mortality of the colonies could not be attributed to

a single factor, such as viruses, bacteria, protozoa, parasites, insecticide substances, but that it was due to the combination among these factors (vanEngelsdorp et al., 2009). The phenomenon affected also Europe: During 2012 -2014 years, the European Commission financed an epidemiological study to explore the phenomenon of the loss of bee colonies in 17 European countries (Chauzat et al., 2014). Italy is currently facing two new health emergencies: the first one was due to an exotic parasitic *Aethina tumida* (Figure 2) (Mutinelli et al., 2014) which caused outbreaks reported in Calabria region in 2014; in this context, the commitment of the Veterinary Public Health aims to safeguard national beekkeeping from the progress of the infestation and to protect the economic interests of the farmers from the inevitable restrictions related to this situation. To this aim, a national monitoring plan against infestation by *A. tumida* involving the whole Italian veterinary services was put in place from 2014 and is updated yearly (Ministry of Health, 2016).



Figure 2.  
*Aethina tumida*

The second health emergency for Italian beekkeeping is represented by the introduction of a **predatory wasp**, *Vespa velutina nigritorax* (Figure 3) coming from France, where the wasp was accidentally introduced in 2005 from the South East Asian region (Haxaire et al., 2006). This exotic predator, even dangerous to humans, arrived in Liguria region in 2012. Currently, the **monitoring network** established by the Ministry of Agriculture, “**Stop velutina**”, reports the presence of *V. velutina* in Piedmont and Veneto regions (Stop Velutina, 2017).

## The risks for agricultural production and environment

The severe affection of Apoidea in general and of the species *Apis mellifera* in particular, compromises the quantity and quality of agricultural production, as well as the safeguarding of the survival of plant and therefore of environmental biodiversity. According to data provided by the European Commission, the contribution of bees with respect to the European agricultural production is estimated to be at least 22 billion euro per year. This means that approximately the 80% of agricultural and plants production depends on the activity of pollinating bees (European Commission, 2017). The European food safe authority (EFSA), which deals with health problems of bees from few years, is currently studying a shared model for assessing the health of beehives. One of the latest activities undertaken by EFSA has been the establishment of a blog, [#Efsa4Bees](#), which aims promoting the sharing of information among researchers involved in the fight against bee pathogens and pesticides (EFSA, 2016).



Figure 3.  
*Vespa velutina nigritorax*

## Veterinary Public Health and beekeeping

In the past veterinary public services were not always able to respond adequately to demands of beekeepers, mainly because beekeeping, considered as a form of minor animal husbandry, is not foreseen by the training programs of the faculties of Veterinary Medicine. This, on the one hand left a wide space for other professions lacking of adequate skills to manage animal health issues, such as drug surveillance and food hygiene, on the other hand, encouraged the development of a strong tendency of Italian beekeepers, "d.i.y (do it yourself)". Another consequence of this situation is a certain opposition from beekeepers to the choice of following the regulatory requirement for other livestock technicians, basing on an estimated peculiarity of this kind of animal husbandry in contrast with others. The result of this situation reflects, sometimes, the difficulty to create a dialogue between beekeepers and veterinarians, leading to the disruption of national beekeeping.

The solution of these problems was given by the implementation of the National Beekeeping Registry, implementing Decree of 12 April 2009 of the Ministry of Health. According to the report of the Audit team prepared by DG-SANTE in June of 2016 in Calabria and Sicily regions, in order to collect information on the bees health conditions, "the system of registration of the apiaries and their movements being implementation is a promising tool for the monitoring and control of bee health". The same working group, however, identified critical issues, one of the most important related to a non-systematic and timely reporting of outbreaks of bee diseases to the National Information System for the notification of animal diseases (SIMAN), which hinders the knowledge on the real spread of notifiable disease agents on the national territory and prevents the proper management of health and hygiene issues in the farms (DG-SANTE, 2016).

## The veterinary science for beekeeping

The competence of the veterinarian is an essential element for protecting bee health, as well as for safeguarding the health of the hive products intended for human consumption. Although it would be desirable to have a program of training activities coordinated at central level standardized throughout the national territory, this does not preclude that some successful activities may arise from single research institutions (Figure 4). It's important to improve both the diagnostic capability of laboratories against infectious and parasitic diseases, and the identification of pesticides responsible for acute and subacute poisonings of beehives. Emergency protocols have to be identified in case of suspected poisoning of the apiaries allowing to promptly find poisoning substance as well as the source of contamination and, possibly, the responsible of improper use of pesticides. Scientific research must face important

challenges, especially on the theme of the fight against the hive diseases. There is an urgent need of availability of new active drugs to fight varroa, as it is expected that those currently in use may develop resistance in future, as occurred in the past for many acaricide substances (Milani, 1999). The category of beekeepers should be properly formed and has to become aware on the importance of the application of the **Good Practices in beekeeping**, as it is now clear that the health of beehives could not rely only on the use of drugs (Formato, 2011).

Figure 4.  
The veterinary science for beekeeping



## Conclusions

Bees are considered as one of the most important resources for the protection of crops, as well as warrantors of the equilibrium of eco systems that are the pillars of life on Earth.

They represent a common good for humankind that has to be defended with determination from biological and environmental factors threatening its survival.

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