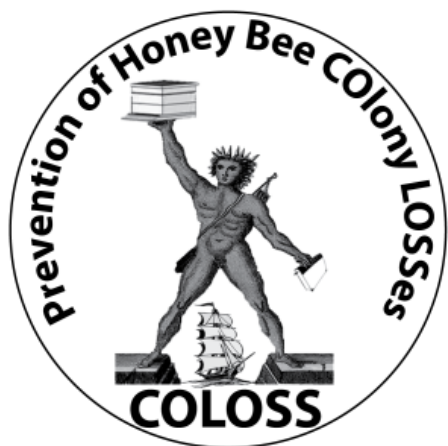


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VELUTINA TASK FORCE KICKOFF MEETING

Proceedings

Grugliasco, Italy, 18th - 20th February 2016

VELUTINA TASK FORCE KICKOFF MEETING

Topic

- Kick-off meeting of the Velutina Task Force to provide an update on *Vespa velutina* bionomy, ethology and ecology in its native range and its status of invasive alien species and to plan organization and future action of the Task Force.

When

- 18th - 19th February 2016

Where

- University of Turin, Department of Agricultural, Forestry and Food Sciences, Grugliasco (Turin Metropoly), Italy

Schedule

Thursday 18th February 2016

Time	Session 1
13.30-14.00 Participant registration and poster set up 14.00-18.00 1st session: Vespa velutina biology, diffusion and containment 20.00-22.00 Social dinner	

Friday 19th February 2016

Time	Session 2
9.00-13.00 2nd session: Vespa velutina monitoring and control 14.00-15.00 Poster session 15.00-17.00 What-to-do? A vision for the <i>Vespa velutina</i> Task Force	
Saturday 20th February	
9.00-12.00 Beekeeper extension day (in Italian)	

ORGANIZER CONTACTS

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Abstracts

Abstract
<i>Vespa velutina</i>, is it a matter of a honey bee health?
Mutinelli F.
Istituto Zooprofilattico Sperimentale delle Venezie; Legnaro; Italy
<p>An alien species is an organism introduced outside its natural past or present distribution range by human agency, either directly or indirectly. This definition implies an active movement facilitated by humans through a number of different pathways, and covers both intentional and unintentional movements of species. Introductions can in fact be intentional and accidental. Those alien species which cause negative impacts on biodiversity, socio-economy or human health are considered as invasive (CBD, 2002).</p> <p><i>Vespa velutina</i> is currently classified as an invasive alien species. It is not considered under the umbrella of honey bee health regulation in the European Union nor included in the World Organization for Animal health (OIE) listed diseases of honey bee. Accordingly, the competence is attributed to the environment agency. The same occurs in Italy where the Ministry of health has no competence on it. The Ministry of agriculture can promote research activity on its spread and possible control taking into consideration the negative impact of <i>V. velutina</i> on honey bee productivity. However, the full competence belongs to the Ministry of environment.</p> <p>The Regulation (EU) No 1143/2014 on invasive alien species entered into force on 1 January 2015. This Regulation seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimize and mitigate the human health or economic impacts that these species can have. The regulation foresees three types of interventions: prevention, early detection and rapid eradication, and management. A list of invasive alien species of Union concern will be drawn up and managed with Member States using risk assessments and scientific evidence.</p> <p>The OIE Terrestrial Animal Health Code (Terrestrial Code) sets out standards for the improvement of terrestrial animal health and welfare and veterinary public health worldwide, and for safe international trade in terrestrial animals (bees included) and their products. The health measures in the Terrestrial Code should be used by the veterinary authorities of importing and exporting</p>

countries for early detection, reporting and control of agents pathogenic to terrestrial animals and, in the case of zoonoses, for humans, and to prevent their transfer via international trade in terrestrial animals and their products, while avoiding unjustified sanitary barriers to trade. According to these concepts, an invasive alien species such as *V. velutina* does not fall within the competence of OIE.

Abstract

Overview of the knowledge gained in France on the Asian yellow-legged hornet, *Vespa velutina* (Hym.: Vespidae), and its invasion in Europe

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Muséum National d'Histoire Naturelle - UMR7205 CNRS ISYEB

The abundance and impact on honeybees of the Asian hornet *Vespa velutina* caused great concern among French public authorities and beekeepers. Since 2004, the hornet spread throughout most of France and, from 2010 to 2014, successively arrived in Spain, Portugal, Belgium, Italy and Germany. We present here the knowledge gained by French scientists on this species and its expansion in Europe.

1. The invasion is monitored by the MNHN, mainly by nest recording through public warning (<http://frelonasiatique.mnhn.fr>): after ten years, the hornet already spread out 410 000 km² (almost 3/4 of France).
2. The invasion risk was assessed using modeling tools of climatic suitability: *V. velutina* is expected to spread throughout Europe and recent climate change scenarios showed that future range expansion may be even larger.
3. A genetic study of *V. velutina* populations from France and Asia enabled to describe the history of the invasion: the hornet originates from Chinese provinces adjacent to Shanghai and the strong consanguinity in French population indicates that a unique but multi-mated queen was probably introduced in France.
4. Dissection of 77 nests from France showed that mature colonies can produce up to 13,000 individuals and several hundreds of founder queens.
5. Contrary to Asian honey bees, *Apis mellifera* in France is unable to defend against *V. velutina* attack while the hornet mainly impacts colonies by disturbing foraging.
6. Two native parasitoids (a conopid fly and a nematode) now attack *V. velutina* in France but they are unable to slow down the invasion.

Abstract

Active involvement of beekeepers in monitoring and management of alien invasive species

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Beekeepers had different altitude to the invasive alien species. As long they have some advantage with increased honey production they even try to propagate such species, like invasive metalliferous plants. On the other hand they experience the worst possible result of improper transportation of the bees around the world with the introduction of the alien parasite Varroa which is the major cause for most of the problems with the survival of honeybee colonies. This direct experience makes beekeepers valuable group of citizens that can help in general with the monitoring and management of the invasive species. In case of alien hornets they have even direct interest which can make their involvement in citizen science project much easier. With additional experience that exist with citizen science type project like C.S.I. Pollen we can contribute to the preparation of the project that will directly involve beekeepers. In areas where is not yet present any Asian species, we can start working with beekeepers to better understand European hornet that could be even more endangered if alien invasive species will be monitored with uncontrolled wide campaign. A well educated approach is necessary to protect authentic *Vespa crabro*.

Abstract
Awareness of beekeepers and public of <i>Vespa velutina</i> arrival
Filipi J.1, Drazic M.2, Kezic N.
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<p>After the introduction of Asian hornet to Italy, several articles had been published for public and beekeepers describing biology of the hornet and threats that may cause. Croatia is at the moment still free from invasion of <i>V. velutina</i>.</p> <p>European hornet (<i>Vespa crabro</i>), native to Croatia, can cause serious losses but it is rare and depends on the year and location. The knowledge and experience from kick off meeting in Italy will be beneficial to build up strategy to confront the <i>Vespa velutina</i> invasion.</p>

Abstract
Deepening the knowledge on the behavioural ecology of <i>Vespa velutina</i>: sexual attraction and competition with native hornets
Cini A.1, Anfora G.3, Cappa F.1, Pepiciello I.1, Petrocelli I.1, Turillazzi S.1, Bortolotti L.2, Cervo R.1
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<p>Slightly more than ten years ago, in the South West of France, the alien yellow legged hornet <i>Vespa velutina</i> (hereafter VV) was spotted for the first time. As it was immediately understood, VV was not yet another alien species, but rather a high-impact pest species, due to its huge invasion potential, habitat flexibility and specialization in honeybee predation. Indeed, the VV threat is currently faced by several European countries. Despite the great economic interest and the large amount of researches carried out in these years, many knowledge gaps still prevent from developing efficient management approaches. In this talk we will show the results of our studies, which deal with two important aspects that received, so far, only a marginal attention: VV mating system and the possible competition with the native European hornet <i>Vespa crabro</i> (hereafter VC). Natural history of VV has been</p>

rather investigated, but almost nothing is known about its mating system. In the light of the development of specific odorant attractants to be used in mass trapping, we investigated, thanks to behavioural, chemical and electrophysiological assays, the possibility that VV reproductive females emit pheromones to attract males, as it has been suggested to occur in other Vespinae species. Even if preliminary studies suggested a male preference for reproductive females, we did not find for the moment any strong male response to potential female odorant attractants. On the other hand, we still lack information about the mating system of VV in the wild. The interaction between VV and their main prey in the invaded area, i.e. *Apis mellifera*, has been the focus of many researches. On the other side, its impact on non prey species, such as the VC which shares a very similar ecological niche and might thus suffer from indirect competition for several resources, has been poorly addressed. We thus investigated two life history traits that might pose the two species in competition: i) the ability to find food sources and the flexibility in exploiting them, and ii) the immunocompetence response that might give advantage in terms of pathogen resistance. Our results show that VV and VC might enter into competition for resources, and that the two species differ in their immune response. This study sets the stage for future investigations on these poorly investigated topics.

Abstract

Spatial containment of *Vespa velutina* in Italy and establishment of an Early Warning and Rapid Response System

Bertolino S., Liroy S., Porporato M.

DISAFA, University of Turin

Introduced populations of the Asian hornet *Vespa velutina* are established in South Korea, Japan and different European countries: France, Spain, Portugal, Belgium, Germany and Italy. In Italy, the first Asian hornet was found in 2012 in Liguria; first nests were located in Liguria (5 nests) and Piedmont (1 nest) in 2013. In Europe, the species is considered invasive, both for its ability to spread over large areas and the impacts that it could produce preying on honey bees and wild insects. Colonial nests are often established in urban areas, therefore attacks to humans are possible. In 2015 a European LIFE project started with the aim to contain the species spatially: STOPVESPA LIFE14/NAT/IT/001128. The Project is targeting on an invasive

alien species already established in Europe and candidate to be included in the list of invasive alien species of Union concern (the Union list: EU Regulation 1143/2014).

The main objective of STOPVESPA is to avoid the impact that invasive *V. velutina* could produce to honey bees and the Italian biodiversity through a comprehensive approach, which includes: 1) Prevention of new establishments by the identification of drivers and pathways of introduction; 2) Establishment of an Early Warning and Rapid Response System in order to intercept new invasions; 3) Development of an effective control campaign. The control campaign will be based on different actions: creating a coordinated coalition of trained beekeepers able to detect wasps and nests; develop, test and apply a prototype of harmonic radar that will be used to track flying wasps homing back to their nests, with the use of transponders applied on the thorax of the insects; develop an effective method to remove or neutralize colonial nests.

The actions planned foresee: defining the distribution and size of *V. velutina* colonies, setting up methods and tools to monitor and control the species, removing or neutralizing the colonial nests, assessing the negative impacts of the species, identifying drivers and pathways of introduction, collecting biological information, establishing an Early Warning and Rapid Response System, establishing an Emergency Team, networking and disseminating the “best practices” at a national/international level.

Abstract
Control methods of <i>Vespa velutina nigrithorax</i> de Buysson
Decante D.
Association pour le développement de l’apiculture provençale (ADAPI) ITSAP – Institut de l’abeille
Following its introduction in France and spread across other European countries, <i>Vespa velutina</i> has been designated as a second category statutory pest for apiculture in 2013. The French Ministry of Agriculture then constituted a task force, comprising several environmental and beekeeping institutions, in order to establish a pest control plan based on adequate control methods. The ITSAP – Institut de l’abeille designed technical data sheets describing the summer and autumnal trapping and nest destruction methods, based on the consensus among these institutions. In addition, the

ITSAP – Institut de l'abeille was also commissioned to evaluate the different traps and baits available for trapping methods for apiary protection during summer and autumn. The different control methods of *V. velutina*, such as foundress trapping in spring, workers trapping in summer and autumn, nest destruction and toxic baiting are reviewed. Advantages, drawbacks and knowledge gaps of these methods are detailed. Reasons explaining why they were adopted or rejected by the task force in 2013 are clarified, and perspectives for a future implementation are considered. Results of the evaluation conducted in 2013-2014 and 2014-2015 on workers trapping for apiary protection during summer and autumn are presented. Attractiveness and selectivity of each bait and trap tested, as well as efficacy regarding foraging activity of bees, population levels, honey stock and mortality are detailed. Finally, perspectives offered by a number of biological control agents are listed.

Abstract

Monitoring and fighting *Vespa velutina* in Italy: an example of cooperation between research and practice

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Vespa velutina, (Hymenoptera: Vespidae) is an invasive predator of honeybees accidentally introduced into Europe from eastern Asia. It was observed for the first time in southwest France in 2004 and in the following years it rapidly spread almost all over the country. In 2011 it reached Spain, the year after Portugal, and in 2013 it was officially reported in Italy, in Liguria region near the border with France, where it was present since 2012. In three years it invaded the whole province of Imperia, both in the coast and along the valleys, and it was occasionally reported also in the South Western of Piedmont and in one locality in South Eastern Piedmont.

Since its arrival in Italy, several initiatives have been taken by research centers, local institutions and beekeeping associations to prevent expansion to other regions and to limit its presence in the invaded areas. The VELUTINA project, funded by the Italian Ministry of Agriculture, includes both research and surveillance topics: adult monitoring; development of methods for nest detection; studies on wasp chemical communication; development of protocols for surveillance and nest destruction. Monitoring was performed in 5 Italian regions - the two where the hornet is already present and three bordering ones – with the cooperation of Universities, research centres and beekeeping associations.

Nest destruction represents nowadays the most effective method to limit the diffusion of the hornet, but it shows limits and inconveniences. Many nests are cryptic and difficult to reach, their destruction is costly and risky for the staff and there are no approved methods for it. At present in Italy nest destruction is mainly carried out by volunteer beekeepers. In France, when it is accomplished by companies specialized in pest eradication, it can cost from 150 to 550 Euros per nest. Within VELUTINA project some progresses have been made towards the official recognition of the method, thanks to the cooperation with national and regional institutions. The researchers of VELUTINA project together with beekeepers are studying an alternative method to limit the presence of *V. velutina* in front of the apiaries and to reduce their populations in the environment. The method under investigation is effective, selective and simple to apply. The first achieved results will be illustrated.

Abstract

Towards a national protocol for rapid action upon notification of Yellow-legged Hornet nests by the population in Italy

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In the regions of Italy where the yellow-legged hornet is present, beekeepers and public authorities invite citizens to report the nests. When beekeepers find a nest near their apiaries, they often intervene to destroy it on their own. However, when the nest is reported near a house, it is unclear who should take action, and this can lead to speculation. In addition, if the colony is killed but the nest is not removed, a series of repeated reports for the same nest may be generated, resulting in a waste of time and resources.

To prevent over-reporting and to determine who should act, the spread of the species in the territory must be monitored on a widespread level and attendance data must be recorded. In addition, it is essential to organize an emergency network that is active at the time of reporting, agreed between the authorities and the various regional administrative bodies responsible for handling emergencies, setting out precisely who should do what, how to act and the safety rules to be applied.

We designed a protocol that describes the sequence of actions to be taken to achieve a national system of active surveillance by citizens against the Asian hornet. This system aims to inform operators about the presence of nests detected by citizens and enable a rapid response, activating the local intervention team, suitably equipped, and trained to destroy the colonies of *V. velutina* and remove their nests.

Abstract

Hovering above the yellow-legged hornet nest

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5Università di Pisa; Dipartimento di Scienze Veterinarie; Pisa; Italy

Within the VELUTINA project, funded by the Italian Ministry of Agriculture, a multisensory device was conceived, built, and assembled on an octocopter drone and tested in the field. The multisensory device is based on visual, auditory, olfactive, and thermic cues. Here we report preliminary results obtained through a visual and thermic remote approach using the drone. The experimental fly area was a circle with a 300-meter radius with a yellow-legged hornet's nest in it with a diameter of 80 cm. The nest position was unknown to the operators and the permitted fly quota ranged between 30 and 50 meters. By means of visual cues alone it was not possible for the operators to detect the nest, but it was easily detectable by the remote thermo-sensor after image processing using ThermoViewer software. Moreover, surprisingly, it was possible to detect a single hornet flying away from the nest and follow it to a distance of 10 meters from the nest. These preliminary results indicate the possibility of merging thermographic images with the geo-tagged data obtained through a mobile harmonic radar.

Abstract

Design and test of a single-pulse, single-polarization harmonic radar for the tracking of the Asian yellow-legged hornet and future developments

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DISAFA, University of Turin

The yellow-legged Asian hornet is an invasive species of "Vespa", indigenous of the South-East Asia but recently spreading in Southern Europe. Because of its exponential diffusion and its serious threat to the local honey bee colonies (and to humans as well), restraint measures are currently under investigation. We developed and tested an harmonic radar capable of tracking the flying trajectory of these insects, once equipped with a small transponder, in their natural environment. Several hornets were captured close to a small cluster of honey bee hives, tagged with different transponders and then released in order to follow the flight towards their nest. On field testing proved an initial maximum detection range of about 125 m in a hilly and woody area. A number of detections were clearly recorded and preferential directions of flight were identified. The system herein described is intended as a first low-cost harmonic radar; it proved the capability to track the hornets while flying and it permitted to test the tagging techniques. The designed system has three major advantages over conventional harmonic radars. Firstly and most importantly, it adopts advanced processing techniques to suppress clutter and to improve target detection. Secondly, it allows radar operations in complex environments, generally hilly and rich of vegetation. Finally, it can continuously track tagged insects (24/7) and in any meteorological condition, providing an effective tool in order to locate the nests of the yellow-legged Asian hornet. To improve the detection and the range of operation of the harmonic radar, several upgrades have been identified during this work and are under development.

Abstract

Integrated pest management: a holistic approach to *Vespa velutina* control

Manino A., Laurino D.

DISAFA, University of Turin

Integrated pest management (IPM) is adopted mostly to cope with native and alien agricultural pests, but its principles can be applied to other pests too; therefore a *Vespa velutina* integrated management control could be fulfilled both in *V. velutina*'s natural range and where this invasive species has been introduced. IPM requires the subsequent implementation of prevention, assessment, and control measures in a cost-effective manner: control is to be applied only in case the established action thresholds are exceeded. In such a case, all the available preventive, ecological, biological, physical-mechanical, and chemical management tactics should be used in a coordinate effort with special regard to their environmental impact.

In integrated *V. velutina* management (IWM) preventive tactics, like quarantine and avoidance, can be implemented in early invasion phases, while it should be turned to the remaining tactics in the later containment and mitigation phases. In any case, the prevention of the diffusion of *V. velutina* could prove to be very difficult in areas where environmental conditions are favourable. *V. velutina* parasites, predators, and diseases are little known, but their relevance for classical biological control seems rather scarce; the development of biotechnical methods, such as the use of semiochemicals, could be more promising provided that the constraints deriving from the large areas involved, and therefore the high costs, can be overtaken. Several physical and mechanical control methods, mostly based on the use of a wide array of traps, have been proposed in the last decade but the results so far attained are at best moderate due to attractiveness, selectivity, and effectivity problems. Since the widespread spraying of insecticides would meet insuperable environmental difficulties, the selective application of chemicals by means of baits or other devices could be investigated provided it were both economically and ecologically sound. In any case, before an effective IWM could be proposed, intensive research on both biology and control of *V. velutina* is urgently needed.

Abstract Poster

Can bee lining as well bioacoustics techniques be applied to the detection of *Vespa velutina* nests?

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The search for the nests of *Vespa velutina* is an essential aspect in the fight against this voracious predator of bees. Many techniques have been tried to date but most of these require expensive instrumentation, which makes them not easy to be applied throughout the territory. The capture of individuals of *V. velutina* and the application on their body of small transmitters needs to manipulate these dangerous insects and the likely loss of many radio transmitters. It may be interesting to see if the technique of bee lining, used at least since the Middle Ages to individuate wild honey bee colonies, can not be applied to the research of *V. velutina* nests. The only tool required for this technique would be a particular box constructed to capture and release the wasps. IF the bee lining technique would work with *V. velutina*, this simple tool could be used by every beekeeper to actively search nests in his area, maybe in cooperation with other beekeepers. Another technique that could be evaluated is the use of directional microphones or other powered microphones. Inhabited nests of *V. velutina* could be analyzed and searched for an acoustic profile. If it appeared that the big nests of common hornets as well of *V. velutina* could be identified at a distance, this technique could be used, perhaps in combination with bee lining, for a thorough search on a large scale. In fact, the equipment needed for the acoustic approach is in widespread use among both naturalists as well the operators in the field of acoustics. These are two proposals that could be verified without particular investments, but of course in areas where Asian predatory wasp is present.

Abstract Poster

Diversity of the chemical signature in the invasive hornet *Vespa velutina*

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The yellow-legged hornet, *Vespa velutina nigrithorax*, was accidentally introduced to southwestern France in 2004, probably as a result of ceramic pottery being imported from China by boat. The species subsequently successfully established itself in France and Europe. The hornet now occurs across more than 60% of France and is currently colonizing neighboring countries (Spain, Portugal, Belgium, and Italy). It is predicted that the species will continue to spread along the Mediterranean coast and will invade northern Europe. Since the species preys on several insect and arthropod taxa, it can have a significant effect on biodiversity. *V. velutina* is a pest in France because it preys upon domestic honeybees, *Apis mellifera*. Beekeeping operations are directly affected by *V. velutina* predation, with some beekeepers reporting colony losses. The species presents also a risk to human health. Accidents have occurred, some of which have resulted in death, when people have accidentally approached the hornet's nests.

Among the different subjects we analyze (biology and ecology of the species, selective trap...), we study the chemical signature (cuticular hydrocarbons or CHCs) of the invasive hornet. Preliminary study shows that few insects were introduced in France, probably only one queen. In this condition, we wanted to show whether the chemical signature is different among colonies or not. First, cuticular hydrocarbons were identified in GC-MS. Second, we analyzed the CHCs according to individuals. Hornets have specific CHCs according to their gender, their caste and their colony. These differences in the chemical signatures are linked to the relative quantity of each compound. Moreover, in each caste from the same colony, it is possible to separate different groups of individuals with their CHCs. This plasticity of the chemical signature could be linked to the age or the function of each individual.

Abstract Poster
Preparedness measures to combat <i>Vespa velutina</i> in Croatia
Mihaljević I., Svečnjak L., Prđun S.
University of Zagreb Faculty of Agriculture; Zagreb; Croatia; Department of Fisheries, Apiculture, Game Management and Special Zoology
<p><i>Vespa velutina</i>, the Asian predatory wasp is a species of hornet indigenous to Southeast Asia. As an invasive species it represents great concern to European countries as well. <i>V. velutina</i> has appeared in France, Spain, Portugal, South Korean and Japan. Further invasions are expected in various countries including Croatia. Although <i>V. velutina</i> contributes to the loss of honeybee colonies, little is known about its biology and behavior both in the native and invaded area. <i>V. velutina</i> opportunistically hunts a very wide range of insects. The mayor concern about its invasiveness however is that when <i>V. velutina</i> finds a bee colony or an apiary, it tends to settle down and specialises in honeybee as their pray. An update on <i>V. velutina</i> bionomy, ethology and ecology is of great importance for countries on its path of native range. The presence of <i>V. velutina</i> has not yet been confirmed in Croatia, but given it represent additional threat to already jeopardized colonies, it would be of great importance to acquaint basic preventive measure in order to be ready to combat this invasive species.</p>

Abstract Poster
Preliminary results on the surveillance of <i>Vespa velutina</i> in Lombardy
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<p>After the detection in Liguria region of the invasive Yellow-legged hornet, <i>Vespa velutina</i> (Hymenoptera: Vespidae) at the end of 2012, the attention to this insect has risen in Italy. As this invasive species is already well adapted to the European climate and it has rapidly spread and settled in France and Spain, a surveillance system has been organized in different Italian regions. Among the activities undertaken there is the one that involves the University of Milan (DeFENS) with the surveillance of 33 stations, 30 of which located in eleven Lombardy provinces and 3 in Emilia Romagna (Piacenza province). One Tap Trap® baited with beer was placed in each locality from May to November 2015. In six localities located in three provinces (Bergamo, Lecco and Piacenza) also one Tap Trap® baited with fishbased food was positioned</p>

(a commercial fish extract dissolved in water).

Samples were collected fortnightly and conserved in ethyl alcohol 70% and transported to DeFENS laboratory (University of Milan), where specimens were separated and stored in 70% ethyl alcohol until identification to the lowest taxonomic level (species, genus, family). Vespoidea were immediately checked for the eventual detection of *V. velutina*. More than the half of the samples collected has been checked and until now the invasive hornet was never detected. Different wasps and social bees have been captured. Among Vespoidea, *Vespa crabro*, *Vespula* spp. and *Polistes* spp. have been detected and among Apoidea *Apis mellifera* and *Bombus terrestris* have been identified. Many adults of Lepidoptera Noctuidae and Diptera Brachicerae belonging to different families (Muscidae, Calliphoridae, Sarcophagidae and Drosophilidae) were also captured. More rarely Coleoptera, belonging to different families were found.

Abstract Poster

Recent collaborative research in France on *V. velutina*

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The biology and ecology of alien species are often poorly known in their novel invaded area as well as in their native range. Due to such missing biological and ecological data, the development of eradication or control programs is often difficult. The Asian yellow-legged hornet, *Vespa velutina*, first observed in 2004 in Europe presents the following characteristics: (i) it preys on a wide variety of arthropods, mainly pollinators, and especially the domestic honeybee, *Apis mellifera*; (ii) as a social vespid living in large and well organized colonies, it represents a very interesting model for studying behavioral ecology and even neurobiology.

V. velutina was accidentally imported from eastern China to southwest France. It started then to spread all over France but also to neighboring countries like Spain, Portugal and Italy. It is now considered a threat either for beekeeping activities and biodiversity in these countries. Ecological, economic and societal impacts appear now significant, either directly or indirectly. Although this species is known to be a major predator of honeybees, its biology, ecology and behavior are still poorly known, even in its native range. Almost 10 years after its introduction in Europe, research on this predator is growing up and several collaborative projects are now ongoing in France, Spain and Italy. We present here an overview of our recent research on *V. velutina* realized in France. First, we aimed to unravel the social biology of hornets. We thus explored their nest and reproduction biology, and studied their hunting and exploration behavior. Second, since olfaction plays a crucial role in social hymenoptera and vespids, we performed a thorough description and understanding of their brain and olfactory pathway and searched for attractive volatiles. Third we tested different monitoring methods, and fourth we studied the evolution of defensive behavior of bees.

All research progress will be useful for developing control programs at the international level, and proposing sanitary precautions to limit the risks of expansion to other countries and the risks of future biological invasions.

Workshop Summary

Aim of the meeting:

- Kick-off meeting of the *Velutina* Task Force to provide an update on *Vespa velutina* bionomy, ethology and ecology in its native range and its status of invasive alien species and to plan organization and future action of the Task Force.

Some brief presentations have been delivered but the objective of the meeting was to discuss the different problems and propose common initiatives aimed to find solutions. The members were thus asked to participate actively and not to come to the meeting only with the spirit to be present and eventually learn about the news. The presenting members were asked to keep the talks brief and leave more time for the discussion.

After the presentations that were organized during the program and the following discussions of the group the following points have been underlined:

- monitor the spread of *Vespa velutina* in Europe and Asia;
- assess *V. velutina* impact on honey bees and the rate of colony losses resulting from the action of this pest;
- study *V. velutina* bionomy, ethology, and ecology either in its natural range or in invaded areas;
- develop sound control methods and monitoring
- prepare all together a leaflet or communicative material on the *V. velutina*
- prepare common database with all European localities where *V. velutina* adults and nests has been observed
- summarize the list of the participants that are COLOSS members
- summarize the list of *V. velutina* website
- create a public link where are contained all the materials of the *Velutina* Task Force (<https://drive.google.com/open?id=0B5MANrkRbqXdWEFLUk5DbFh0emc>)
- Next *Velutina* Task Force meeting will be held in Cluj-Napoca, Romania, on the occasion of the 2016 COLOSS conference from 10th to 11th September 2016.

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