

LIFE14 NAT/IT/001128 STOPVESPA

*Realized with the financial contribution of the LIFE
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After-LIFE plan

***for the management of Vespa velutina populations in Italy and
the continuation of communication and dissemination activities***



**POLITECNICO
DI TORINO**



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Vespa velutina: distribution in Italy and impacts

The yellow-legged hornet *Vespa velutina* is an invasive alien species introduced in France in 2004, through the passive and accidental human-mediated transportation of founder queens. Thanks to its spread capacities, the species has rapidly colonized several European countries and Italy since 2012. The first colonies were located by the Department of Agricultural, Forest and Food Science (DISAFA) of the University of Turin in the western part of Liguria (Imperia district) and in the southern part of Piedmont (Cuneo district). In these two regions, the species has increased its range in a different way, probably due to the climatic conditions that determine a different environmental suitability (Fig. 1).

In Liguria, *V. velutina* increased its range with a spread rate of about 18 km/year in the period 2013-2015, spreading from the municipality of Ventimiglia (Imperia) towards east, along the coast, and towards north, ascending the valleys and colonizing the hinterland. In 2015, the species was widespread in an area from Ventimiglia to Imperia. In 2018, the presence of the species was also confirmed in the municipalities of Finale Ligure (Savona) and La Spezia, several kilometres away from the main invaded area. These populations originated from the passive and accidental human-mediated transportation of *V. velutina* queens, which were probably hidden in various kind of materials (e.g. timber, straw, hay, soil, gardening goods). In Piedmont, *V. velutina* reports were sporadic over the years, and were located mainly in few municipalities of Cuneo district (Monastero di Vasco, Vicoforte Mondovì, Monasterolo Casotto and neighbouring municipalities).

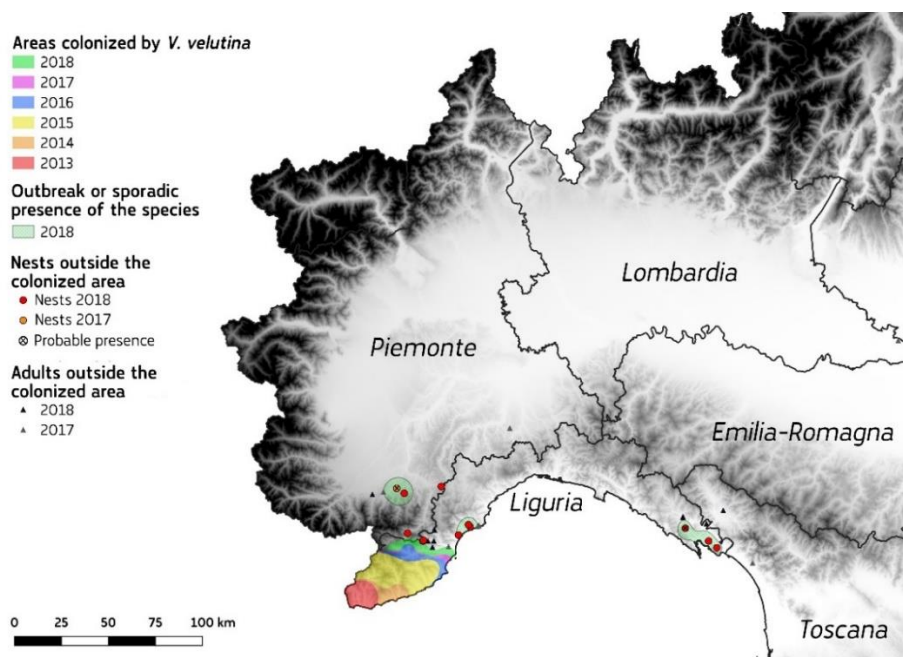


Figure 1 - Distribution of *V. velutina* in Italy at the end of 2018: the areas from red to green highlight the expansion of *V. velutina* in the western part of Liguria region from 2013 to 2018. In addition, the map reports the localities where adults were found (triangles) and outlier nests were located: orange circles, nests of 2017; red circles, nests of 2018.

The accidental human-mediated transportation of *V. velutina* queens caused the origin of reports from other Italian regions.

- ❖ Veneto: Bergantino (Rovigo district) in 2016;
- ❖ Lombardy: Borgofranco sul Po (Mantova district) in 2017; this report is related with nearby report of Veneto;
- ❖ Tuscany: Pietrasanta (Lucca district) in 2017 and Massa (Massa-Carrara district) in 2019; the last report is related with the nearby outbreak of La Spezia.

The absence of further reports from Veneto and Lombardy in the following years suggest the absence of viable populations from these Regions, while its presence in Tuscany is confirmed by 2019 reports.

V. velutina generates an impact in particular on honey bees and beekeeping, since *Apis mellifera* is one of the favourite species preyed by this hornet (Fig. 2). *V. velutina* causes the weakness or the collapse of honey bee colonies, with losses that could depends on the area, the density of nests, the beekeeping practices and the simultaneous presence of other bees pathologies. *V. velutina* can also generate an impact on entomological biodiversity, due to the predatory activity against other insects, such as Hymenoptera (wild bees and wasps) or Diptera (flies) or insects of other orders. To the possible negative effect caused by the direct predation (primary effect) derive a secondary effect on pollination ecosystem services. Finally, the species may cause social impacts associated with the presence of nests in urban and rural environments, and economic costs for the removal of colonies (Fig. 3).



Figure 2 - Honey bee colony completely collapsed due to *V. velutina* predation.

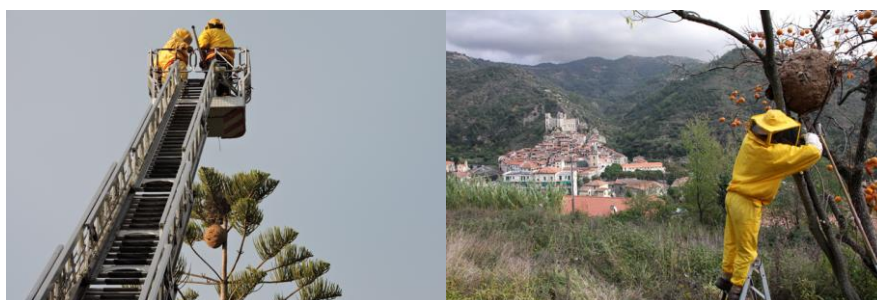


Figure 3 - Activities of nest destruction for *V. velutina*.

Objectives and strategies of LIFE STOPVESPA

The LIFE STOPVESPA project is coordinated by DISAFA of the University of Turin with the collaboration of the Polytechnic University of Turin, a beekeeper association of Piedmont (ASPROMIELE) and the Abbey of Benedictine Fathers S.M. of Finalpia. The project operated in Liguria and Piedmont from 2015 to 2019, to define an integrated management strategy for *V. velutina*, in order to limit the expansion of this invasive species. The developed strategy foresees a differentiated approach based on the area of intervention and the presence or absence of *V. velutina* populations. LIFE STOPVESPA has developed three distinct procedures:

- ❖ **an extensive monitoring network in Liguria and Piedmont;**
- ❖ **an early warning and rapid response system;**
- ❖ **an extensive control strategy in the main colonised area.**

LIFE STOPVESPA is a pilot project with the aim of developing new techniques for locating nests, which can improve the effectiveness of the management strategy for *V. velutina* (Fig. 4). For this reason, two harmonic radar prototypes were developed; this technology, specifically designed and developed by the project, allows tracking the flight of the insects and thus locating the position of *V. velutina* nests.



Figure 4 - Monitoring and destroyer teams of the project.

Main results achieved

LIFE STOPVESPA has developed a management strategy for *V. velutina* that has allowed to contain the expansion of this invasive alien species in Italy, thanks also to the involvement of citizens and stakeholders. The following figure summarise the main results achieved by the project (Fig. 5), while a detailed description of the results is available in the [Layman's report](#) or in the final report of each actions, which are available on the project website (www.vespavelutina.eu).

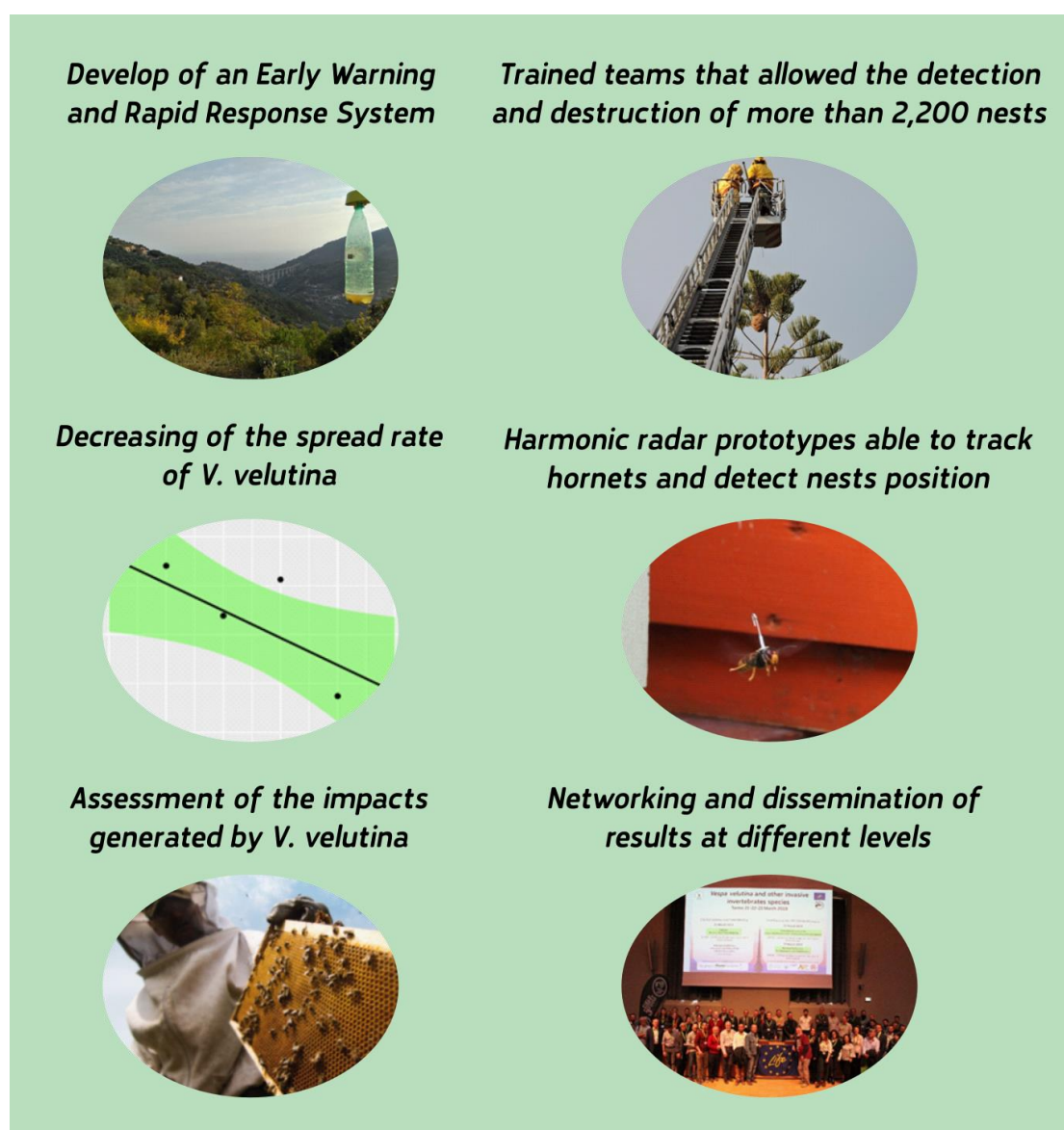


Figure 5 – Summary of the main results achieved by the LIFE STOPVESPA project.

Communication activities realised by the project

The LIFE STOPVESPA project has developed an effective communication campaign for consistently spread information concerning *V. velutina* and, more in general, the necessities of controlling invasive alien species, with the aim of developing an early warning and rapid response system for *V. velutina*. The communication strategy, adapted to the specific context, was developed through the integration of several tools:

- ❖ meetings with citizens or stakeholders such as beekeepers or Civil Defence teams;
- ❖ round tables with beekeepers associations and local or regional authorities;
- ❖ public events and conferences;
- ❖ dissemination of news and updates through the media, the project website or social media channels (Facebook), the realization of videos and newsletters;
- ❖ environmental education activities with the schools;
- ❖ communication materials (brochures, leaflets, posters).

Communication activities allowed to disseminate information and updates concerning *V. velutina* or project activities, and many of the provided information were published by local or national media.

COMMUNICATIVE TOOLS	RESULTS
Project website: www.vespavelutina.eu	46.850 unique users engaged from the activation of the website to the end of the project
Social media channel (facebook): Life StopVespa	20.987 engaged users
Meetings and conferences with citizens	45 events with citizens and beekeepers
Participation to beekeeping fairs and public events	14 events attended by the project with stands
Meetings with authorities and stakeholders	25 meetings or specific round tables
National and international conferences	39 conferences and congresses , of which 20 in Italy and 19 in Europe
Environmental education activities with the schools	1.140 students engaged in the training activities with the schools
Training courses and workshops	151 participants to training courses and workshops organised by the project
Communicative materials realised by the project	33.000 leaflet, 10.000 brochure, 5.000 Layman's report, three banner, six notice boards, 11 poster, one documentary (LIFE for the Bees), one trailer and two videoclips
Activities with media	133 news published by the media were citing the project or its activities; three press conferences and one participation at a national TV programme

SWOT analysis

STRENGTHS	WEAKNESSES
The LIFE STOPVESPA strategy has helped to contain the spread of <i>V. velutina</i> in Italy and limit its impact on honey bees and native insects. Furthermore, the removal of nests from urban areas has decreased the likelihood of contacts between <i>V. velutina</i> and citizens, decreasing the risk of accidents.	At the beginning of LIFE STOPVESPA, <i>V. velutina</i> had already colonized a large portion of the project area (Imperia district, Liguria) reaching high-density values. This prevented the possibility of permanently remove the species from Italy, and project actions were addressed to contain the invasion.
The project developed two harmonic radar prototypes able of tracking the flight of insects in complex environments. These tools could be used in the management of <i>V. velutina</i> outbreaks or for the management of other similar invasive species. In addition, the developed activities generated an advancement in the radar field.	Harmonic radar prototypes developed by the project will remain available for future needs and for the management of new invasive outbreaks. Activities with the radar involves costs that should be covered by organizations, institutions or Authorities that request the use of the radars.
The contacts between the project and the company "Zapi" allowed to provide an authorized insecticide for the treatment of <i>V. velutina</i> nests in Italy. This product was not available before the beginning of LIFE STOPVESPA.	Complementary control methods have been tested, as the intensive <i>V. velutina</i> queen spring trapping. This technique seems able to decrease the impact of <i>V. velutina</i> towards <i>A. mellifera</i> , however the technique may generates negative consequences on native insects, and further research is necessary before an extensive application of the method.
LIFE STOPVESPA has greatly extended the monitoring network for <i>V. velutina</i> , involving several beekeepers and beekeeping associations.	
Communication and dissemination activities allowed to raise awareness among people on the problems associated with the presence of <i>V. velutina</i> .	
OPPORTUNITIES	THREATS
LIFE STOPVESPA created a strategy for the effective management of <i>V. velutina</i> in Italy and developed procedures that can be transferred to other geographical areas. Furthermore, the knowledge acquired in the management of <i>V. velutina</i> can contribute to the development of the management plan for this species, as requested by the European and the national legislation (Reg. EU 1143/2014; Italian law 230/2017).	The late detection of new invasive outbreaks will not allow to timely act for the detection and destruction of the first nests founded by the species. This would generate an exponential increase in the number of <i>V. velutina</i> nests in the new colonised area.
The involvement of Civil Defence teams allowed to train people and volunteers in nest destruction procedures. Many of the trained people will continue to operate on <i>V. velutina</i> colonies after the end of the project.	The diffusion of <i>V. velutina</i> in Italy requires the development and maintenance of a long-term control/management strategy in the colonised regions, which requires the availability of constant funding resources.
Some funding sources may include actions and activities on <i>V. velutina</i> , such as the National Beekeeping Plan or the Rural Development Plan. These resources would allow to continue some of the activities developed by LIFE STOPVESPA.	The adoption of a national management plan for <i>V. velutina</i> would allow to extend the strategy developed by the project to other Italian regions. Nevertheless, the administrative procedure for its adoption requires times that often do not coincide with the spread rate of an invasive species as <i>V. velutina</i> .

After-LIFE objectives and activities

The activities that will be developed after the end of the LIFE STOPVESPA project, in order to maintain the results achieved by the project, are:

- ❖ Monitoring activities;
- ❖ Control activities;
- ❖ Activities with the harmonic radar prototypes;
- ❖ Technical support activities;
- ❖ Communication activities.

Monitoring activities

Monitoring the presence of *V. velutina* in the environment is a fundamental activity for verifying the areas colonised by the species, plan control strategies and monitor their effectiveness. For this reason, the LIFE STOPVESPA project has developed an extensive monitoring network in Liguria and Piedmont, adopting two complementary approaches:

- ❖ **active monitoring network**, realised with monitoring bottle-traps and observation in apiaries of hornets in predation in front of honey bee colonies (Fig. 6);
- ❖ **passive monitoring strategy**, through the verification of reports received from citizens.



Figure 6 - Monitoring methods for *V. velutina*: monitoring bottle-traps and observation in apiaries.

The active monitoring network, which has been increased up to 1,700 monitoring stations during the project period, is based in particular on the contribution of beekeepers, their associations and project partners. Beekeepers and their associations will continue to monitor the presence of *V. velutina* near the apiaries on a voluntary basis, since it is in the interest of the beekeepers to early detect the presence of new outbreaks. The project partners (in particular ASPROMIELE, the Abbey of Benedictine Fathers S.M. of Finalpia and DISAFA) will continue to promote monitoring activities to the beekeepers in Piedmont and Liguria respectively, in order to maintain an efficient surveillance strategy towards *V. velutina*. In addition, project partner will actively contribute to monitoring activities.

PROJECT PARTNER AND BEEKEEPERS ASSOCIATIONS ENGAGED IN THE MONITORING NETWORK FOR <i>V. VELUTINA</i> DURING THE AFTER-LIFE PERIOD	
Liguria	Abbazia Padri Benedettini Santa Maria di Finalpia, Apiliguria, AlpaMiele
Piedmont	Aspromiele, Università di Torino, Agripiemonte Miele, Consociazione Apicoltori della Provincia di Torino, Associazione provinciale apicoltori di Vercelli e Biella

In addition, the project website, which will be managed and maintained by the staff of the University of Turin for at least five years, will allow to collect reports from citizens, thus will ensure the maintenance of a passive monitoring network for *V. velutina*.

Control activities

LIFE STOPVESPA has developed an early warning and rapid response system in project area that allowed to limit the spread and impacts of *V. velutina*. The control strategy involved, besides to monitoring and destroyer teams of the project, Regional and local Authorities, Civil Defence teams, firefighters, thus allowing to share procedures and good practices for removing nests (Fig. 7). Many of the engaged people will continue to act in the coming years, to ensure the protraction of control activities against *V. velutina*, both on a voluntary basis and within regional management strategies.



Figure 7 - Trained teams, Civil Defence teams and firefighters in action for removing *V. velutina* nests.

Liguria Region

The area mostly colonised by *V. velutina* is Liguria, in which control activities will continue thanks to the Civil Defence teams trained by the project and who have collaborated in these years.

CIVIL DEFENCE TEAMS OF IMPERIA DISTRICT TRAINED TO ACT AGAINST <i>VESPA VELUTINA</i> NESTS	
Protezione civile di Ospedaletti	Protezione Civile S.S. Trinità di Imperia
Protezione Civile di Cervo	Protezione Civile di Ceriana
Protezione Civile di Bordighera	Protezione Civile di Taggia
Protezione Civile Riviera dei Fiori	Protezione Civile di Vallecrosia
Associazione Rangers d'Italia	

The management strategy and the procedures developed by LIFE STOPVESPA will be maintained after the end of the project. The Regional Authority of Liguria has identified the protected area “Parco Alpi Liguri” as the territorial subject with competence for the management and coordination of control activities, adopting the procedures developed by LIFE STOPVESPA. For covering the costs of the control activities after the end of the project, the Region has already dedicated about 50,000.00 euro. The Parco Alpi Liguri, together with the support of the Civil Defence Regional Operative Room, will manage nests reports, while the references previously activated by the Region in coordination with the LIFE STOPVESPA project remains active:

- ❖ Civil Defence Regional Operative Room (+39 010 548 5990; +39 010 548 5991);
- ❖ Hotline of Regione Liguria (+39 800 445 445);
- ❖ email of Regione Liguria (vespavelutina@regione.liguria.it).

Piedmont Region

The different climatic and environmental conditions of Piedmont prevented to the species to spread and reach densities similar to those of Liguria. In fact, of the 2,205 nests located during the project, only six of these were located in Piedmont. These differences impose different regional strategies. *V. velutina* reports from Piedmont will be verified by ASPROMIELE and by the University of Turin, who will be able to directly act in removing nests. Moreover, firefighters and Civil Defence teams have provided willingness in supporting control activities in future years. The references for gathering reports from citizens in Piedmont are:

- ❖ ASPROMIELE (+39 0171 693689; +39 346 6027829);
- ❖ University of Turin, DISAFA (+39 011 6708586).

Activities with the harmonic radar prototypes

The two harmonic radar prototypes developed by the Polytechnic University of Turin and used in the LIFE STOPVESPA strategy are available for future control activities of *V. velutina*. Their use is of particularly importance in the new outbreaks caused by the passive transport of *V. velutina* queens, since harmonic radar prototypes would allow to timely detect and remove the nests, even before the beginning of the reproductive phase of the species. This would prevent the establishment of *V. velutina* in the invaded areas.

However, control activities with the harmonic radar prototypes requires trained personnel and costs related to travel and subsistence, which must be covered by the Institution that request the intervention.



Figure 8 - Second prototype of entomological harmonic radar (left) developed by LIFE STOPVESPA for locating *V. velutina* nests (right). Two tagged hornets are present near the entrance of the nest.

Technical support activities

The knowledge acquired by LIFE STOPVESPA has been shared with the Regional Authority of Liguria, which will continue the control activities for *V. velutina* adopting the procedures and the strategies developed and tested by the project. This knowledge will also be transferred upon necessities to organizations and institutions called to manage *V. velutina* populations in other Italian regions, and will be used as a model to develop the National Management Plan for *V. velutina* requested by the European Regulation 1143/2014 and the relative Italian legislation (Decreto legislativo 230/2017).

Communication activities

Communication activities play a key-role in projects addressing invasive alien species, and should constantly be implemented in parallel to control and management strategies. For this reason, LIFE STOPVESPA partners will continue to disseminate the results of the project through institutional channels and any additional and specific future funding opportunities that will become available. The University and the Polytechnic of Turin are engaged in training and dissemination activities as an institutional task, through lectures and seminars and by participating at national and international conferences. The researchers who participated in LIFE STOPVESPA will therefore continue to disseminate the results and knowledge acquired with the project, also through the publication in scientific papers. Furthermore, the University of Turin is planning to organize further training courses on the modalities to safely remove *V. velutina* nests, in order to share the acquired knowledge and knowhow gained with the project. Given the presence of *V. velutina* in Tuscany, the University is planning a training course in February 2020, in collaboration with the local beekeeper Association ToscanaMiele. ASPROMIELE and the Abbey of Benedictine Fathers S.M. of Finalpia periodically organise meetings and training courses for the beekeepers. These events will allow continuing the dissemination of project results to the beekeepers.

The communication materials produced during LIFE STOPVESPA have been widely distributed in Liguria and Piedmont and can be downloaded from the project website. The Layman's report, printed in 5,000 copies during the last months of the project, will continue to be distributed in coming years during events and meetings attended by project partners. The website and the social media page will be updated for at least five years, and will be used to provide information concerning *V. velutina*, also by sending newsletters to the registered users.

COMMUNICATION ACTIVITIES OF PROJECT PARTNERS PLANNED IN THE AFTER-LIFE PERIOD	
Università di Torino	Participation at national and international conferences, as the 46th International Apicultural Congress (Apimondia 2019, Montréal) and the periodic meetings of the Velutina Task Force of the CoLOSS Association
	Publication of scientific papers
	Organization of training courses on the modalities to safely remove <i>V. velutina</i> nests
	Management of the project website
Politecnico di Torino	Participation at national and international conferences; publication of scientific papers on the harmonic radar prototype for tracking hornets
Aspromiele	Communication activities with the beekeepers during courses, meetings and national conferences. Publication of articles on beekeeping journals.
Abbazia dei Padri Benedettini S.M. Finalpia	Communication activities with the beekeepers during courses, meetings and public events.

Financial resources

For continuing the control activities against *V. velutina*, the Regional Authority of Liguria has already dedicated 50,000.00 euro to the protected area “Parco Alpi Liguri”, for covering the costs of nests destruction since the beginning of August 2019. At the moment, it is not possible to forecast the availability of dedicated financial resources for the following years.

To continue the communication and the monitoring activities for *V. velutina*, the University of Turin will use its own resources as no other external financial sources have been identified. The other project partners will also use own resources for carry on their respective activities.

Piedmont Region, which has supported the LIFE STOPVESPA project, in the preparation of the grant’s call for the beekeeping sector for the period 1 August 2019 – 31 July 2020 (D.D. 30 luglio 2019, n. 761) excluded *Vespa velutina* from the research topics that can be funded with the sum included in the tender of 20,000.00 euro (Annex 4, point 2). The remaining funds of the call (965,740.27 euro) is dedicated exclusively for beekeepers Associations ASPROMIELE, AgripiemonteMiele and Piemonte Miele, and no specific action against *V. velutina* are expected. It is not possible to predict if Piedmont Region will allocate specific resources for supporting control activities against *V. velutina*. However, a specific interrogation was presented to the President of the Regional Council of Piedmont by the councillor Dr. Daniele Valle, asking *<to immediately act, in collaboration with Liguria Region, allocating funds for the eradication and containment of Vespa velutina and to verify the availability of other European funds for this important initiative.>*