Climate change increases the risk of invasion by the Yellow-legged hornet, *Vespa velutina* var. *nigrithorax* (Hym.: Vespidae)

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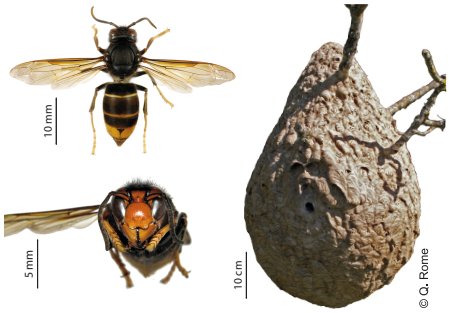
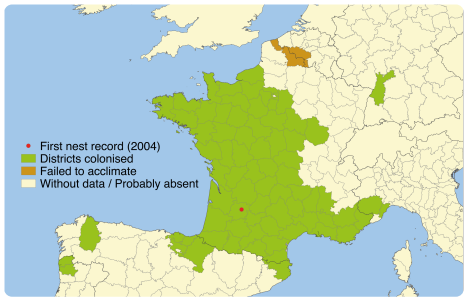


Adult worker and nests of *Vespa velutina* var. *nigrithorax*.

The **high abundance** and impact on honeybees of the Asian hornet *Vespa velutina* have caused great concern among European public authorities and beekeepers *(Beggs et al., 2011)*. The species was reported for the first time in France in 2004 and **spread out across 67 French districts** (ca. 370 000 km²) **within 10 years** *(Rome, 2014)*. It also reached neighboring countries (Spain, Portugal, Belgium, Italy and Germany).

➡ **Its wider expansion in Europe is soon to be expected.**



Actual distribution. Data obtained from confirmed public records on the INPN-MNHN database (*Rome, 2014*)

Modelling the species climatic suitability

- 69 localities from its native Asian range
- 69 localities randomly selected from the 4165 French and Korean invasive records (INPN database 2010)
- 8 climatic variables for current conditions (WorldClim)
- 8 niche-based modelling, using BIOMOD under R
- 10 runs weighted according with AUC

➡ Consensus map 2010 of mean suitability probability
Need a validation with 4 more years *(work in progress)*

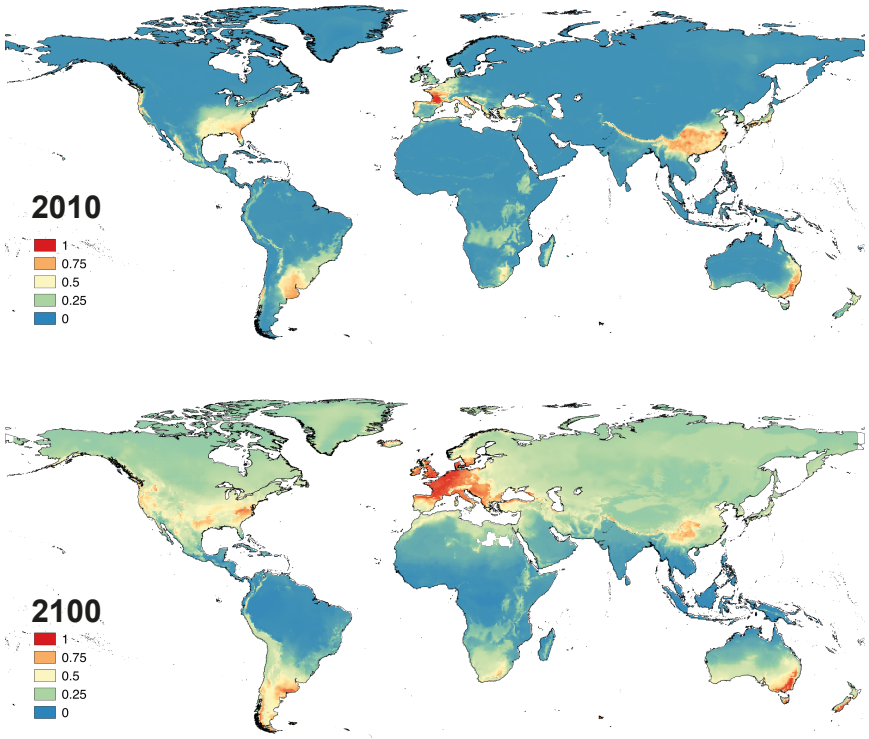
(Villemant et al., 2011)

Modelling this suitability for the future

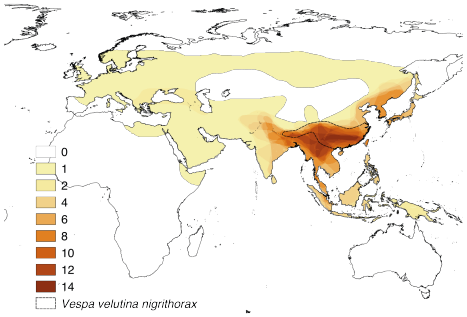
- Every previous model with their 10 runs
- Projected under 13 climatic predictions (GCM and SRES for 2100)

➡ Consensus map 2100 of mean suitability probability

(Barbet-Massin et al., 2013)



Predicted consensus distributions of *V. v. nigrithorax* under **current climatic conditions (2010)** and **future climatic predictions (2100)**. The suitability probability increases from blue to red.



Species diversity of hornets (22 *Vespa* spp.). The local species richness increases from pale yellow to brown *(Villemant et al. 2011)*.

- In Korea, where 6 other hornet species are present, *V. velutina* spreads at 10-20 km/year *(Choi et al., 2012)*.

  In Europe where only *Vespa crabro* is present, *V. velutina* spreads at around 60 km/year.
- In native areas *Vespa velutina* is present with up to 14 other hornet species.

  With global warming, the risk of accidental introduction of other hornet species around the world increases.

Adult worker hornet in front of a beehive.

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