Louvain-La-Neuve 10 novembre 2013

Contribution des abeilles à un environnement et une agriculture durables

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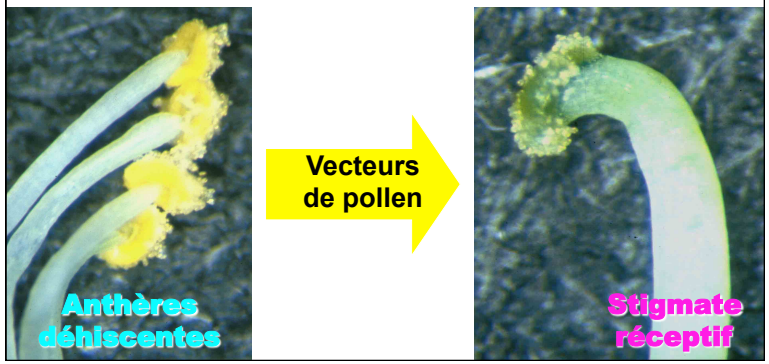
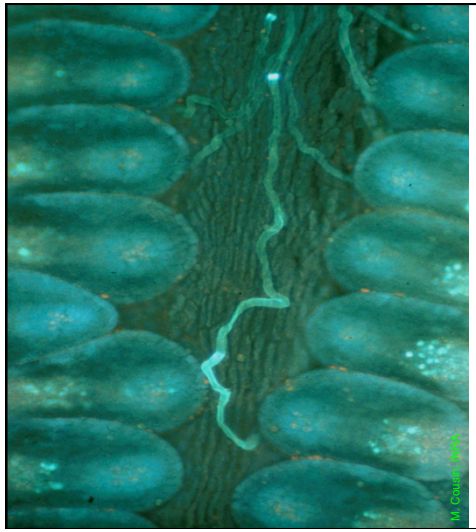
SGS / Sam Droege

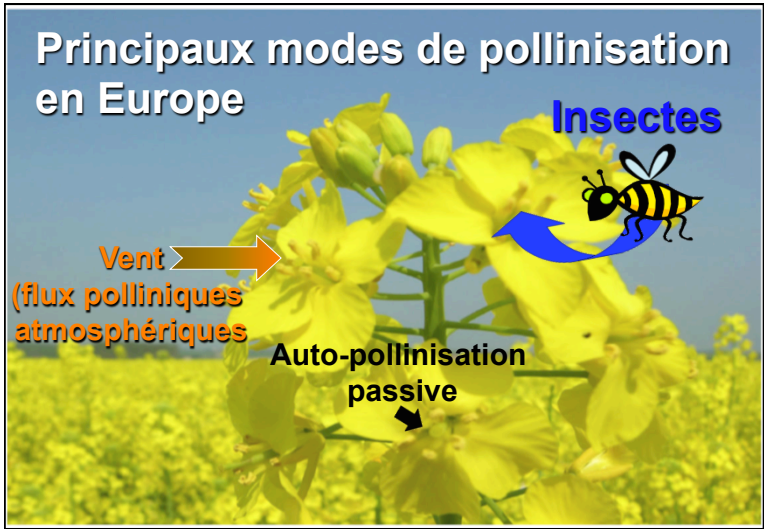
INRA SCIENCE & IMPACT

Pollinisation : Le transfert du pollen des anthères aux stigmates





La pollinisation est un préalable aux processus de fécondation … et donc à la reproduction sexuée de ≈ toutes les plantes à fleurs



1. Morphologie

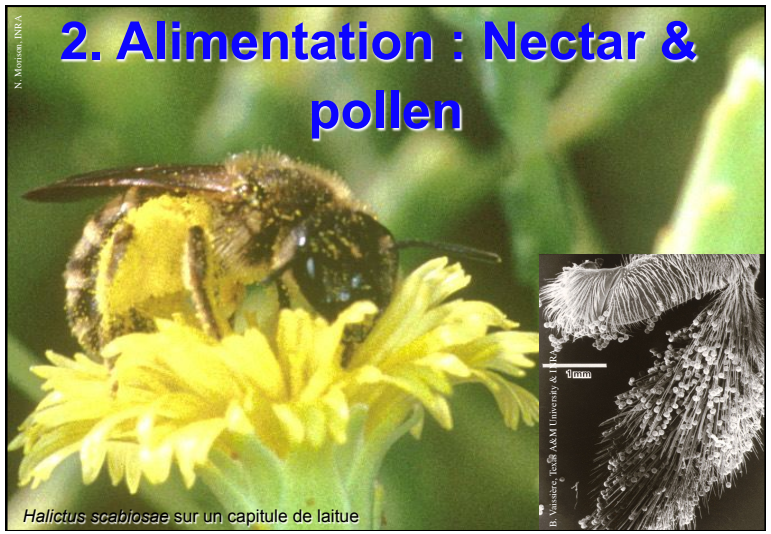
Abeilles

≈

poils branchus

Agapostemon angelicus (halicte)

2. Alimentation : Nectar & pollen



Halictus scabiosae sur un capitule de laitue

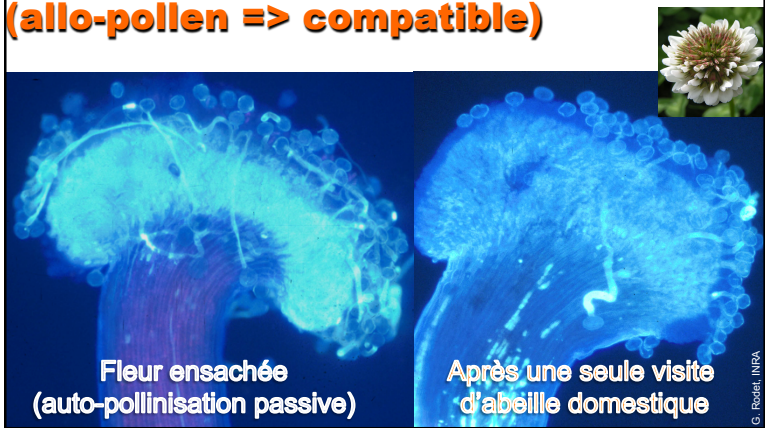
3. Fidélité à une espèce de plante lors d'un voyage de butinage

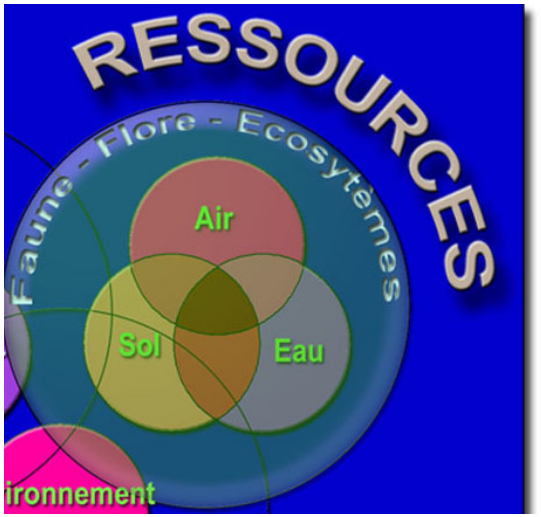
Dasypoda hirtipes sur un capitule d'Astéracée

4. Maintien de la viabilité du pollen sur le corps des abeilles (heures > jours)

Sur le plan quantitatif, les abeilles déposent beaucoup de pollen sur les stigmates en quelques visites

Sur le plan qualitatif, elles déposent du pollen d'origine génétique variée (allo-pollen => compatible)





Environnement durable

Oikos 120: 321–326, 2011
doi: 10.1111/j.1600-0706.2010.18644.x

Subject Editor: Anna Traveset. Accepted 22 October 2010

How many flowering plants are pollinated by animals?

Jeff Ollerton, Rachael Winfree and Sam Tarrant

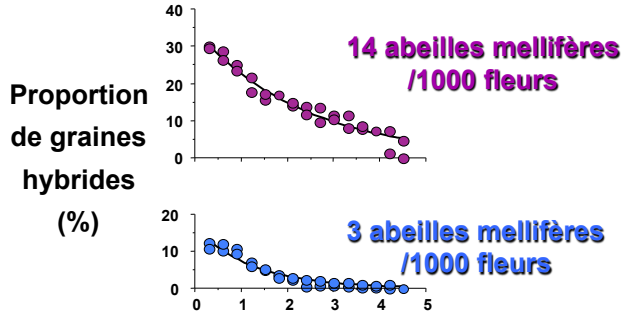
R. Winfree, Dept of Entomology, Rutgers Univ., New Brunswick, NJ 08901, USA.

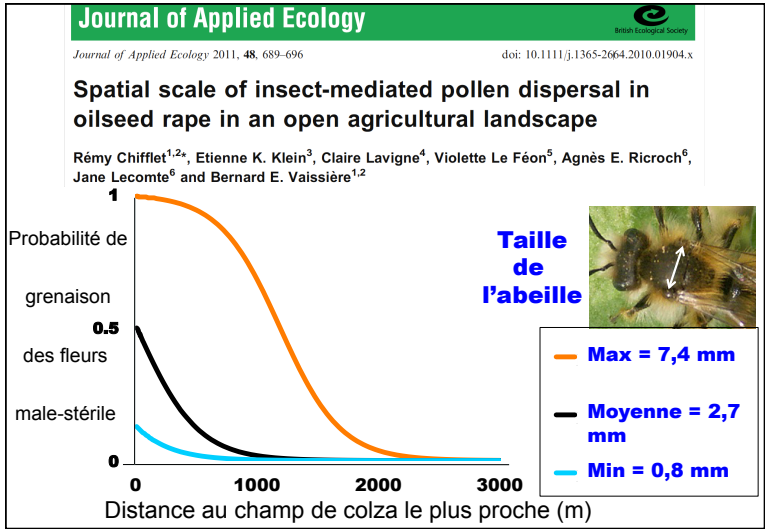
It is clear that the majority of flowering plants are pollinated by insects and other animals, with a minority utilising abiotic pollen vectors, mainly wind. However, there is no accurate published calculation of the proportion of the ca 352 000 species ... and unpublished community-level surveys of plant pollination systems that recorded whether each species present was pollinated by animals or wind. The proportion of animal-pollinated species rises from a mean of 78% in temperate-zone ... species-level diversity of flowering plants. Given current concerns about the decline in pollinators and the possible resulting impacts on both natural communities and agricultural crops, such estimates are vital to both ecologists and policy makers. ... maintaining the functional integrity of most terrestrial ecosystems.

En milieu tempéré, 78% des espèces de plantes à fleurs sont pollinisées de façon exclusive ou dominante par les insectes (abeilles)

La dispersion du pollen dépend de l'abondance des abeilles

(melon ***Cucumis melo***; Foster & Levin. 1967)





Agriculture durable

Système de production agricole qui vise à asurer une production pérenne de nourriture, bois, fibre et biomasse en respectant les limites écologiques, économiques et sociales qui assurent la maintenance dans le temps de cette production

=> protection de la biodiversité, de l'eau et des sols et meilleure utilisation des auxiliaires et services écosystémiques

PROCEEDINGS OF THE ROYAL SOCIETY B

Proc. R. Soc. B (2007) **274**, 303–313
doi:10.1098/rspb.2006.3721
Published online 27 October 2006

Review

Importance of pollinators in changing landscapes for world crops

Alexandra-Maria Klein[1,*], Bernard E. Vaissière[2], James H. Cane[3], Ingolf Steffan-Dewenter[1], Saul A. Cunningham[4], Claire Kremen[5] and Teja Tscharntke[1]

UMR 406 INRA-UAPV Ecologie des Invertébrés, 84914 Avignon Cedex 9, France
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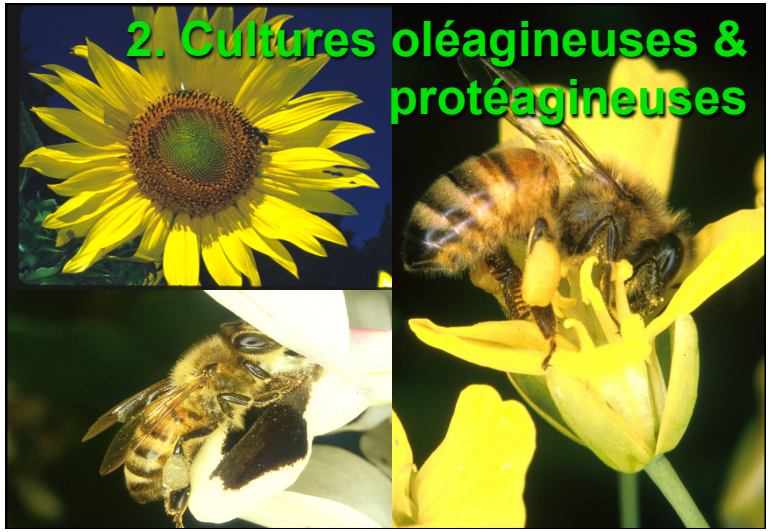
137 Mulford Hall no. 3114, Berkeley, CA 94720, USA

The extent of our reliance on animal pollination for food crop production for human food has not data. In this review, we expand the previous estimates using novel primary data from 200 countries and found that fruit, vegetable or seed production from 87 of the leading global food crops is dependent upon animal pollination, while 28 crops do not benefit from animal pollination. However, global production volumes give a contrasting pers[pective] [...] volumes from crops that do not

37% of our food comes from crops that depend upon or benefit from insect pollination


2. Cultures oléagineuses &
protéagineuses


3. Cultures maraîchères
N. Morison, INRA
N. Morison, INRA


4. Les cultures
porte-graine


Les légumineuses fourragères !

Oecologia (2012) 169:1025–1032
DOI 10.1007/s00442-012-2271-6

PLANT-ANIMAL INTERACTIONS - ORIGINAL RESEARCH

Insect pollination enhances seed yield, quality, and market value in oilseed rape

Riccardo Bommarco · Lorenzo Marini · Bernard E. Vaissière

Received: 12 July 2011 / Accepted: 23 January 2012 / Published online: 7 February 2012

Abstract The relationships between landscape intensification, the abundance and diversity of pollinating insects, and their contributions to crop yield, quality, and market value are poorly studied, despite observed declines in wild and domesticated pollinators. Abundance and species richness of pollinating insects were estimated in ten fields of spring oilseed rape, *Brassica napus* var. SW Stratos™, located along a gradient of landscape compositions ranging from simple landscapes dominated by arable land to heterogeneous landscapes with extensive cover of semi-natural habitats. In each field, we assessed the contribution of wind and insect pollination to seed yield, seed quality (individual seed weight and oil and chlorophyll contents), and market value in a block experiment with four replicates and two treatments: (1) all flowers were accessible to insects, self and wind pollination, and (2) flowers enclosed in tulle net bags (mesh: 1 × 1 mm) were accessible only to wind and self pollination. Complex landscapes enhanced the overall abundance of wild insects as well as the abundance and species richness of hoverflies. This did not translate to a higher yield, probably due to consistent pollination by hone
pollination experim
weight per plant by
quality was enhan
heavier seeds as w
contents, clearly sh
to reach high seed
study demonstrates
timated contributio
yield and the marke

Keywords *Brassi*
Hoverflies · Landsca

Introduction

Pollination by insec
and endangered ec
et al. 1998; Potts et
of up to date studie
surprisingly little i

POLLINISATION ADEQUATE (ABEILLES)

Rendement en huile plus élevé & huile de meilleure qualité

Abeilles & Agriculture => Rendement & qualité

ECOLOGICAL ECONOMICS 68 (2009) 810–821

ELSEVIER

ANALYSIS

Economic valuation of the vulnerability of world agriculture confronted with pollinator decline

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ARTICLE INFO
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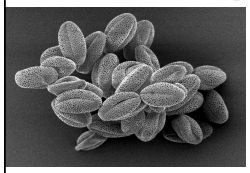
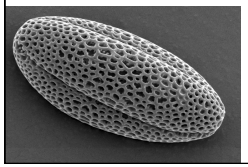
Accepted 7 June 2008
Available online 3 August 2008

ABSTRACT
This is m[illegible] evidence [illegible] and [illegible] many agricultural areas could be significant. We assessed these consequences by measuring [illegible] the contribution of insect pollination to the world agricultural output [illegible] decline. We used a bioeconomic approach, which integrated the production dependence ratio on pollinators, for the 100 crops used directly for human food worldwide as listed by

Valeur économique de l'activité pollinisatrice des insectes en 2012 pour l'Europe = 16,2 milliards € (≈ 10% de la production agricole totale)

Importance of bees to get mono-dispersed viable pollen grains into the air





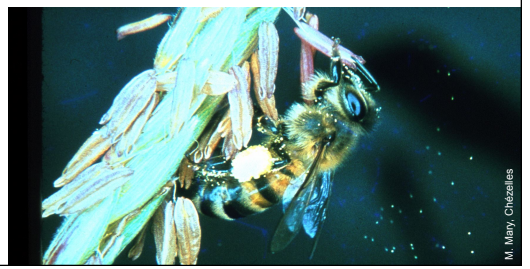
Apidologie 41 (2010) 109–115
© INRA/DIB-AGIB/EDP Sciences, 2009
DOI: 10.1051/apido/2009056

Available online at:
www.apidologie.org

Original article

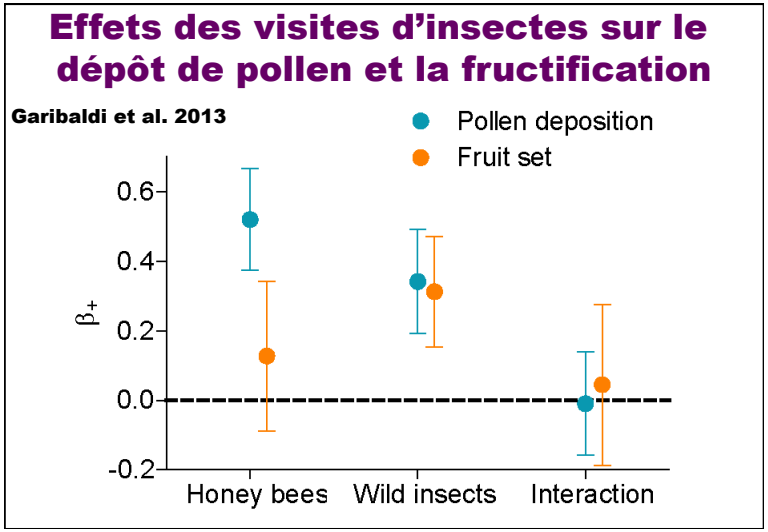
Efficiency of airborne pollen released by honeybee foraging on pollination in oilseed rape: a wind insect-assisted pollination*

Jacqueline PIERRE[1], Bernard VAISSIÈRE[2], Patrick VALLÉE[3], Michel RENARD[3]

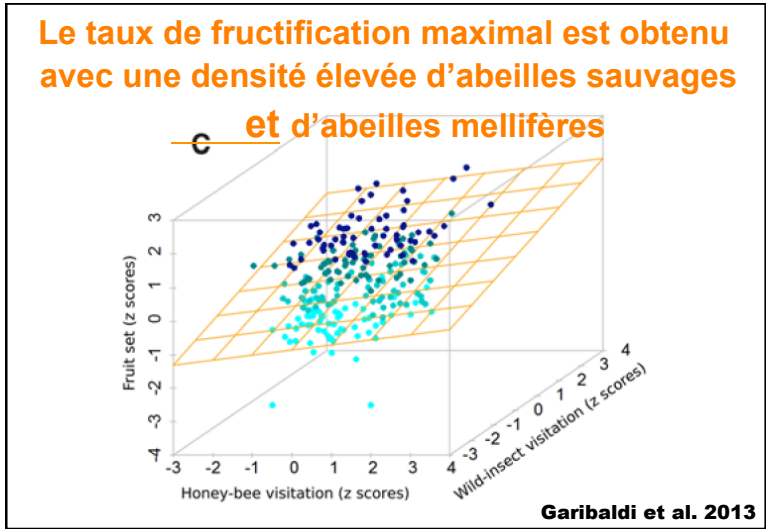


Importance de toutes les abeilles pour optimiser la pollinisation

Effets des visites d'insectes sur le dépôt de pollen et la fructification

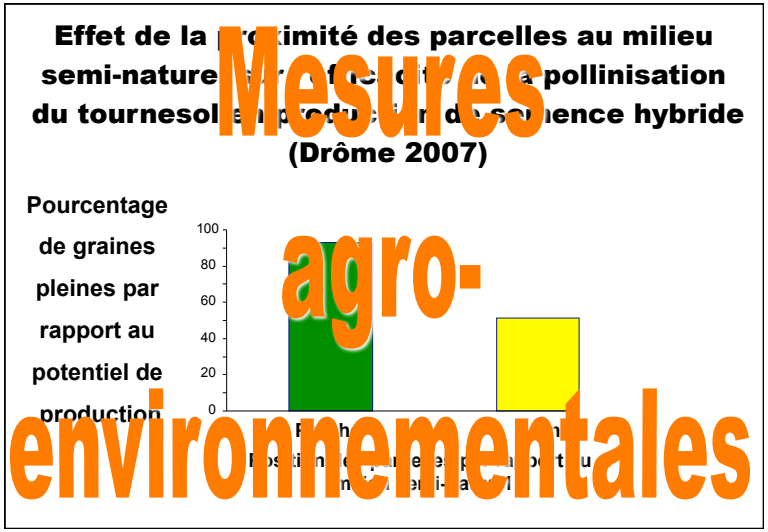


Le taux de fructification maximal est obtenu avec une densité élevée d'abeilles sauvages et d'abeilles mellifères



Effet de la proximité des parcelles au milieu semi-naturel sur la pollinisation du tournesol en production de semence hybride (Drôme 2007)

Mesures agro-environnementales



Pollinisation intégrée des cultures entomophiles

Service écosystémique (faune sauvage)

Practique culturale (introduction de colonies)

Oecologia (2000) 122:288–296

=> 3,1 colonies/km²

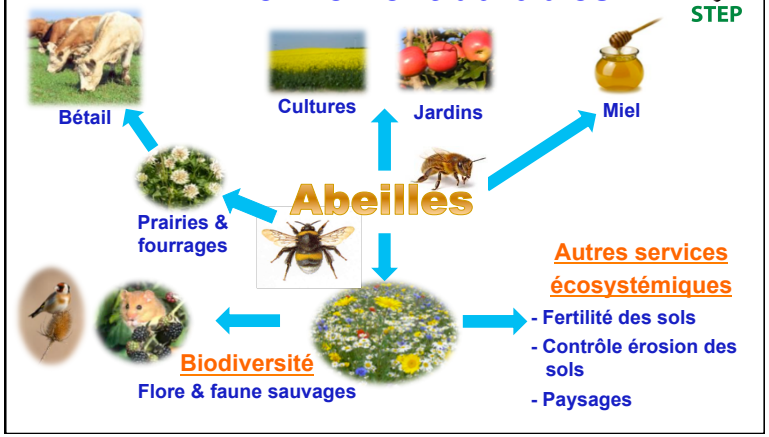
Ingolf Steffan-Dewenter · Teja Tscharntke

Resource overlap and possible competition between honey bees and wild bees in central Europe

With respect to conservation, we suggest a more moderate approach than the total ban on beekeeping which is sometimes demanded for nature conservation areas (e.g. Evertz 1995). The honey bee densities of our study that were near the European-wide average of 3.1 colonies/km² did not appear to affect wild bee populations. To be on the safe side, bee densities in conservation areas should not exceed this level. We conclude from our results that for the conservation of wild bees it is much more important to protect and manage their habitats.

Abeilles => Agriculture et Environnement durables

STEP




100 ANS
Merci de votre attention !