



Apimondia 2025 Köpenhamn





Mjöd bedömning



PLEASE

DO NOT TOUCH

PLEASE


WINE TASTING SHEET

WINE	APPEARANCE	SMELL	TASTE

WINE TASTING SHEET

WINE	APPEARANCE	SMELL	TASTE







PLEASE

DO NOT TOUCH

 DO NOT TOUCH 



Eero J Westerinen Åbo Finland

Conclusions

1. DNA gives comparable results with microscopic analysis
2. DNA is more sensitive, revealing more plant taxa
3. Generally, DNA is a very promising tool for honey producers
4. Honey DNA analysis requires accreditation before used “for real”
5. Also, the determination of honey origin requires more work
→ more honey samples from all over the world
6. Honey adulteration detection using DNA might be possible, **but requires extensive expertise** → one should not jump into conclusions too quickly!

Honey authenticity

DNA approach for honey needs to be:

- independently tested for its robustness and accuracy
- compared with several laboratories in comparative analyses
- based on a wide and confirmed database



The screenshot shows a website with a teal header containing the logo 'food future'. Below the header is a navigation bar with links: 'THE PROJECT', 'PLANET', 'FOOD SYSTEM', 'FOOD SAFETY', 'CONSUMERS AND HEALTH', and 'RESEARCH'. The main content area features an article titled 'Honey authenticity, DNA testing is still unreliable' by Mark Sanger, dated November 19, 2014. The article includes social media sharing icons for Facebook, Twitter, LinkedIn, and YouTube. Below the article title is a photograph of a bee on a document. A second article snippet is visible below, titled ''Adulterated honey', company demolishes fake news' by Mark Sanger, dated November 19, 2014, also with social media icons. At the bottom of the screenshot is a cartoon illustration of a detective wearing a green hat and glasses, holding a magnifying glass and a pipe, standing in front of a honeycomb background. Below the cartoon is a small text block: 'COMPANY - the world's first laboratory for honey testing, with 25 years of history and over 10,000 analyses/year - intervenes statement, to demolish the fake news about "adulterated honey" (1)'. The entire screenshot is presented on a screen that is slightly tilted.

This is how to achieve the requirements

- A. Detailed investigation at the honey sample level
- B. Experimental testing for honey adulteration
- C. Examples of real, authentic honey
- D. Geographic coverage from all over the world



Shortly: detection of honey adulteration using DNA requires more work.

To progress with honey DNA analyses, **many more honey samples need to be processed!**

How to sample more honey?

- 1) Register your honey sample here:

<https://forms.cloud.microsoft/r/eVKa5d1fFx>



- 2) You may send your honey sample to our laboratory or give it to me during Apimondia
- 3) Anyone can participate

HONEY DNA ANALYSIS



IDENTIFYING HONEY CONTENTS

DNA analysis can identify plants, pollen, and microbes in honey



HOW DNA ANALYSIS WORKS



DNA METABARCODING

Specific short regions of DNA are sequenced and matched to reference databases



METAGENOMICS

Entire genomes are sequenced, yielding data on all organisms in the honey



qPCR

Quantifies DNA from particular species or organisms through targeted amplification



UNIVERSITY
OF TURKU

BioName

DNA analyses as turnkey solutions

Thank you!

1. Register your
honey sample



2. If you want
your own results,
then:
order DNA
analysis results

50% sale during
Apimondia 2025



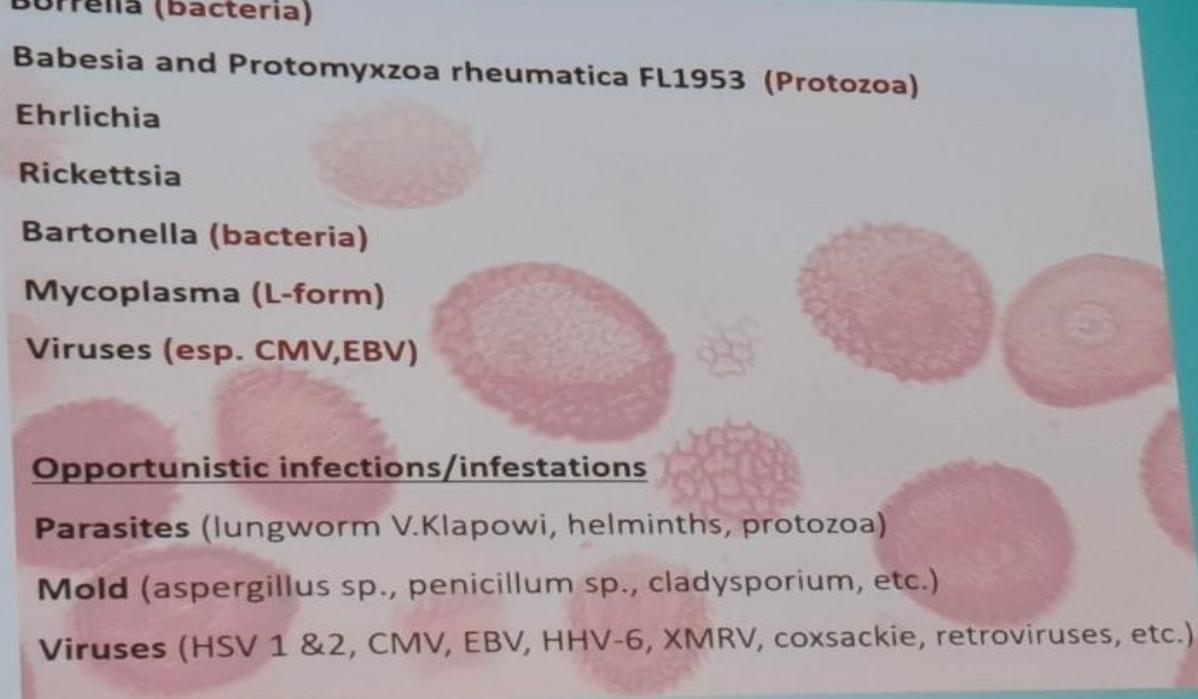
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The Treatment of Alzheimer's and Lyme Disease with API Therapy

Dietrich Klinghardt MD, PhD

Behandling av Alzheimer och Borrelia

LYME BORRELIOSIS: Co-infections and opportunistic infections



Borrelia (bacteria)
Babesia and Protomyxzoa rheumatica FL1953 (Protozoa)
Ehrlichia
Rickettsia
Bartonella (bacteria)
Mycoplasma (L-form)
Viruses (esp. CMV,EBV)

Opportunistic infections/infestations
Parasites (lungworm V.Klapowi, helminths, protozoa)
Mold (aspergillus sp., penicillum sp., cladysporium, etc.)
Viruses (HSV 1 &2, CMV, EBV, HHV-6, XMRV, coxsackie, retroviruses, etc.)

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Does *Borrelia* cause Alzheimer's disease?

- MacDonald, A. B. (2006). Plaques of Alzheimer's disease originate from cysts of *Borrelia burgdorferi*, the Lyme disease spirochete. *Medical hypotheses*, 67(3), 592-600.
- Miklossy, J., Khalili, K., Gern, L., Ericson, R. L., Darekar, P., Bolle, L., ... & Paster, B. J. (2005). *Borrelia burgdorferi* persists in the brain in chronic lyme neuroborreliosis and may be associated with Alzheimer disease. *Journal of Alzheimer's Disease*, 6(6), 639-649.
- Blanc, F., Philippi, N., Cretin, B., Kleitz, C., Berly, L., Jung, B., ... & de Seze, J. (2014). Lyme neuroborreliosis and dementia. *Journal of Alzheimer's Disease*, 41(4), 1087-1093.
- Herrera-Landero, A., Amaya-Sánchez, L. E., d' Hyver de las-Deses, C., Solórzano-Santos, F., & Gordillo-Pérez, M. G. (2019). *Borrelia burgdorferi* as a risk factor for Alzheimer's dementia and mild cognitive impairment. *European Geriatric Medicine*, 10(3), 493-500.
- Meer-Scherrer, L., Chang Loa, C., Adelson, M. E., Mordechai, E., Lobrinus, J. A., Fallon, B. A. & Tilton, R. C. (2006). Lyme disease associated with Alzheimer's disease. *Current microbiology*, 52(4), 330-332.

Lyme and Coinfections: Living in the brain

• *Borrelia* spirochetes inside Hippocampal neurons



Borrelia spiroketer (bakterier) inuti hippocampusneuroner

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Diagnosis	# of Patients	BEE VENOM THERAPY RESULTS				
		Worse	Unchanged	Mildly Better	Good Results	Excellent Results
Gout	5					
Rheumatoid Arthritis (seropositive)	10	1	1		6	5*
Rheumatoid Arthritis (seronegative)	5				4	2
Fibromyalgia (with elevated ESR)	7		1		2	1
Sprain/Strain Cerv. Spine	21			1*	4*	16*
Sprain/Strain Lumbar Spine	22		4*	2*	5*	11*
Disc Injury, Neck	8			1*	4*	16*
Disc Injury, Lumbar	13		2*	3*	4*	4*
Post-Laminectomy Pain	6		1	1	3	1
Arthritis Small Joints Hand	9		1	2	2	4
Painful Bunion	6			1		5
Post-Herpetic Neuralgia	4				1	3
Fracture Nonunion Navicular	1					1
Intractable Pain from Large Burn Wound (after skin grafting)	1					1
Osteoarthritis Knee	2				2	
Ankylosing Spondylitis	2				2	
Vertigo	5				3*	2*
Multiple Sclerosis	1				1	

Sprain/strain
 Lumbar spine =
 Vrickning/töjning
 Ländrygg

Disc Injury, Neck =
 Wippflash

LTH
T E

Segmental Therapy: Cervical Spine

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Behandling
med bigift

2ggr i
veckan

Bee Venom Therapy

The treatment with regular bee venom injections (or direct application of bee stings since the early part of the 1800s) has been used successfully for the treatment of arthritis, chronic fatigue and other debilitating illnesses.

I use injectable bee venom at the Sophia Health Institute in selected patients as a long-term wellness modality that improves cognitive function, pain levels, mood-disorders, auto-immunity and many other symptoms

I slowly increase the dose of bee venom used - to the equivalent of 10 stings twice weekly

To my knowledge, the cleanest source of bee venom: Dr. Janos Koermendy-Racz, Hungary

Does Bee Venom Therapy treat Lyme? Alzheimer's?

- Klinghardt, D. K., & Wa, B. (2005). Lyme disease: a look beyond antibiotics. *Explor Infect Dis*, 14(2), 6-11.
- Socarras, K. M., Theophilus, P. A., Torres, J. P., Gupta, K., & Sapi, E. (2017). Antimicrobial activity of bee venom and melittin against *Borrelia burgdorferi*. *Antibiotics*, 6(4), 31.
- Azam, M. N. K., Ahmed, M. N., Biswas, S., Ara, N., Rahman, M. M., Hirashima, A., & Hasan, M. N. (2018). A review of the antimicrobial activity of bee venom against *Borrelia burgdorferi*.

- Forskning visar att både bigift (bee venom) och dess huvudkomponent **melittin** uppvisar en stark antimikrobiell aktivitet mot *Borrelia burgdorferi*, bakterien som orsakar borrelios (Lyme disease). Melittin har visat sig vara särskilt effektivt för att döda spiroketer (Borrelia-bakteriens aktiva form) och bryta ner dess olika morfologiska former in vitro

Socarras, K. M., Theophilus, P. A., Torres, J. P., Gupta, K., & Sapi, E. (2017). Antimicrobial activity of bee venom and melittin against *Borrelia burgdorferi*. *Antibiotics*, 6(4), 31.

Lyme disease is a tick-borne, multi-systemic disease, caused by the bacterium *Borrelia burgdorferi*. Though antibiotics are used as a primary treatment, relapse often occurs after the discontinuation of antimicrobial agents. The reason for relapse remains unknown, however previous studies suggest the possible presence of antibiotic resistant *Borrelia* round bodies, persists and attached biofilm forms. Thus, there is an urgent need to find antimicrobial agents suitable to eliminate all known forms of *B. burgdorferi*. In this study, natural antimicrobial agents such as *Apis mellifera* venom and a known component, melittin, were tested using SYBR Green I/PI, direct cell counting, biofilm assays combined with LIVE/DEAD and atomic force microscopy methods. The obtained results were compared to standalone and combinations of antibiotics such as Doxycycline, Cefoperazone, Daptomycin, which were recently found to be effective against *Borrelia* persisters. Our findings showed that both bee venom and melittin had significant effects on all the tested forms of *B. burgdorferi*. In contrast, the control antibiotics when used individually or even in combinations had limited effects on the attached biofilm form. **These findings strongly suggest that whole bee venom or melittin could be effective antimicrobial agents for *B. burgdorferi***; however, further research is necessary to evaluate their effectiveness in vivo, as well as their safe and effective delivery method for their therapeutic use.

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BEE VENOM COMPOSITION (Chris Kim MD)

PEPTIDES

- melittin (family)
- melittin F
- apamin
- mast-cell degranulating peptide 401 (MCD)
- secarpin
- tertiapin
- adolapin
- protease inhibitor
- procamine A, B
- minimine
- cardiopep
- histamine (0.9%)

ENZYMES

- phospholipase A2
- hyaluronidase
- acid phosphomonoesterase
- glucosidase
- lysophospholipase
- lecithinase

ACTIVE AMINES

- Histamine
- Octopamine
- Norepinephrine
- leukotriens

NON-PEPTIDE COMPONENTS

- carbohydrates like:
Glucose
Fructose

LIPIDS

- 6 phospholipids

AMINO-ACIDS

- r-aminobutyric acid
- B-aminoisobutyric acid
- Cysteine
- Methionine
- Acids
formic
hydrochloric
orthophosphoric

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Bi-
giftets
olika
delar



Kadyan, P., & Singh, L. (2025). Deciphering the Neuroprotective Action of Bee Venom Peptide Melittin: Insights into Mechanistic Interplay. *Molecular Neurobiology*, 1-14.

Neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease, and multiple sclerosis, are characterized by progressive loss of neuronal structure and function. These conditions often lead to cognitive decline, motor dysfunction, and ultimately severe impairment of daily activities. A key feature of neurodegenerative diseases is chronic inflammation, which contributes to neuronal damage and exacerbates disease progression. Traditional treatments mainly focus on symptomatic relief rather than addressing the underlying causes, highlighting the need for novel therapeutic approaches. Melittin, a bioactive peptide derived from bee venom, has garnered attention for its multifaceted neuroprotective properties, particularly in the context of neuroinflammatory and neurodegenerative disorders. This review delves into the molecular mechanisms through which melittin exerts neuroprotective effects, with a focus on its ability to modulate neuroinflammation, apoptosis, and neurogenesis. Research indicates that melittin can downregulate pro-apoptotic pathways by inhibiting calpain-mediated activation of apoptosis-inducing factor and Bax, thereby reducing neuronal cell death. Additionally, melittin exerts its neuroprotective effects through the inhibition of neuroinflammatory processes, specifically by downregulating key inflammatory pathways such as NF- κ B and MAPK. This modulation leads to decreased production of proinflammatory cytokines and prostaglandins, which are implicated in the pathogenesis of neurodegenerative disorders. Beyond its anti-inflammatory actions, melittin promotes neurogenesis, potentially through the modulation of the BDNF/Trk-B/CREB signaling pathway, which plays a crucial role in neuronal survival and plasticity. These properties suggest that melittin not only provides symptomatic relief but could also address the root causes of neuronal degeneration, presenting a promising avenue for the development of new treatments for neurodegenerative diseases.

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Melittin
tar
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degeneration



Mafek, A., Strzemski, M., Kurzepa, J., & Kurzepa, J. (2023). Can bee venom be used as anticancer agent in modern medicine?. *Cancers*, 15(14), 3714.

Simple Summary

In this paper, we present the current state of knowledge regarding the mechanisms of anticancer activity of bee venom in in vitro and animal model studies. So far, research shows strong anti-cancer potential of both crude bee venom and its main constituent, melittin, by inducing apoptosis and inhibiting the cell cycle without significantly affecting physiological cells. Increasingly frequent animal studies indicate the safety of venom doses that are effective in in vitro studies. This information can help plan future clinical trials.

Abstract

Honey bee venom in its composition contains many biologically active peptides and enzymes that are effective in the fight against diseases of various etiologies. The history of the use of bee venom for medicinal purposes dates back thousands of years. There are many reports in the literature on the pharmacological properties of bee venom and/or its main components, e.g., anti-arthritic, anti-inflammatory, anti-microbial or neuroprotective properties. In addition, both crude venom and melittin exhibit cytotoxic activity against a wide range of tumor cells, with

2023

Hittills visar forskning stark cancerbekämpande potential hos både färskt bigift och dess huvudsakliga beståndsdel, melittin, genom att inducera celledöd och hämma cellcykeln utan att signifikant påverka fysiologiska celler.

Abstract: Propolis, a resinous substance produced by bees, is used as a folk medicine for treatment of periodontal diseases. However, its mode of the action and the compounds responsible for its activities remain obscure. In the present study, we comprehensively investigated the antibacterial activities of ethanol-extracted propolis (EEP) and EEP-derived compounds toward *Porphyromonas gingivalis*, a keystone pathogen for periodontal diseases. Broth microdilution and agar dilution assays were used to determine the minimum inhibitory concentrations of EEP against a range of oral bacterial species, of which *P. gingivalis* showed a higher level of sensitivity than oral commensals such as streptococci. Its antibacterial activity toward *P. gingivalis* was maintained even after extensive heat treatment, demonstrating a high level of thermostability. EEP also induced death of *P. gingivalis* cells by increasing membrane permeability within 30 min. Spatiotemporal analysis based on high-speed atomic force microscopy revealed that EEP immediately triggered development of aberrant membrane blebs, followed by bleb fusion events on the bacterial surface. Furthermore, we isolated artepillin C, baccharin, and ursolic acid from EEP as

Snabb bakteriedödande verkan av propolis
mot *Porphyromonas gingivalis*
Porphyromonas gingivalis = den bakterie
som oftast ligger bakom tandlossning

Siheri, W., Alenezi, S., Tusiimire, J., & Watson, D. G. (2017). The chemical and biological properties of propolis. In *Bee products-chemical and biological properties* (pp. 137-178). Springer, Cham.

Abstract: The term propolis comes from two Greek words, pro (which means for or in defence of) and polis (which means the city); thus, propolis means in defence of the city or beehive. Propolis is a sticky resinous substance, which is gathered from buds and the bark of trees. It is also known as “bee glue” as bees use it to cover surfaces, seal holes and close gaps in their hives, thus providing a sterile environment that protects them from microbes and spore-producing organisms, including fungi and molds. It can be considered to be a **potent chemical weapon against bacteria, viruses, and other pathogenic microorganisms** that may invade the bee colony. Also, bees use propolis as an embalming substance, to mummify invaders such as other insects, that have been killed and are too heavy to remove from the colony. Thus, propolis is important for bee health but it also has activity against many human diseases. It is a **powerful anti-oxidant** and can **modulate** the activity of **reactive oxygen species** within the human body. The most studied aspect of propolis is its **anti-bacterial activity**, which is almost always present at a moderate to high level depending on the exact type of propolis. It is in general more active against Gram positive than Gram negative bacteria, but activity against Gram negative bacteria has been observed. Propolis has been found to be **active against a range of viruses** and also is almost always **active against protozoa** such as *Trypanosoma brucei* and *Leishmania donovani*. Propolis also shows **activity against cardiovascular diseases and diabetes** and has **immunomodulatory effects**. **Anti-cancer activity** has also been observed.

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Inagaki, R., Yamakuni, T., Saito, T., Saido, T. C., & Moriguchi, S. (2024). Preventive effect of propolis on cognitive decline in Alzheimer's disease model mice. *Neurobiology of aging*, 139, 20-29.

Abstract

Brazilian green propolis (propolis)...

Dessa resultat tyder på en förebyggande effekt av propolis på kognitiv nedgång (demens) genom aktivering av intracellulära calcium signalvägar i CA1-regionen hos AD-mössmodeller.

Consistent with behavioral observations, injured hippocampal long-term potentiation was markedly ameliorated in APP-KI mice at 4 months of age following repeated propolis administration. In addition, repeated administration of propolis significantly activated intracellular [calcium signaling](#) pathway in the CA1 region of APP-KI mice.

These results suggest a preventive effect of propolis on cognitive decline through the activation of intracellular calcium signaling pathways in CA1 region of AD mice model.

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- Necip, A., Demirtas, I., Tayhan, S. E., Işık, M., Bilgin, S., Turan, İ. F., ... & Beydemir, Ş. (2024). Isolation of phenolic compounds from eco-friendly white bee propolis: Antioxidant, wound-healing, and anti-Alzheimer effects. *Food Science & Nutrition*, 12(3), 1928-1939.
- Zellagui, D. R., Mokrani, E. H., Allam, A., Ozturk, M., Bensouici, C., & Zellagui, A. (2025). Unravelling Chemical Profile, Antioxidant, Anti-Alzheimer and Antimicrobial Potentials of Three Propolis From Northeastern Regions of Algeria: In Vitro and In Silico Evaluation. *Chemistry & Biodiversity*, 22(5), e202402684.
- Liu, Y., Wu, Z., Zhu, A., Nakanishi, H., Ni, J., Zhong, X., ... & Wu, S. (2017). Brazilian green propolis improves cognitive functions and modulates systemic cytokines in elderly people living at high altitude. *Journal of the Neurological Sciences*, 381, 678-679.
- Ito, T., Degawa, T., & Okumura, N. (2023). Brazilian green propolis prevent Alzheimer's disease-like cognitive impairment induced by amyloid beta in mice. *BMC Complementary Medicine and Therapies*, 23(1), 416.

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Olika underarter av bi

Tested honey bee subspecies

A. m. ligustica

A. m. mellifera

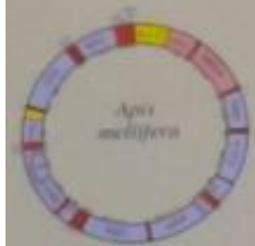
Russian

A. m. carnica

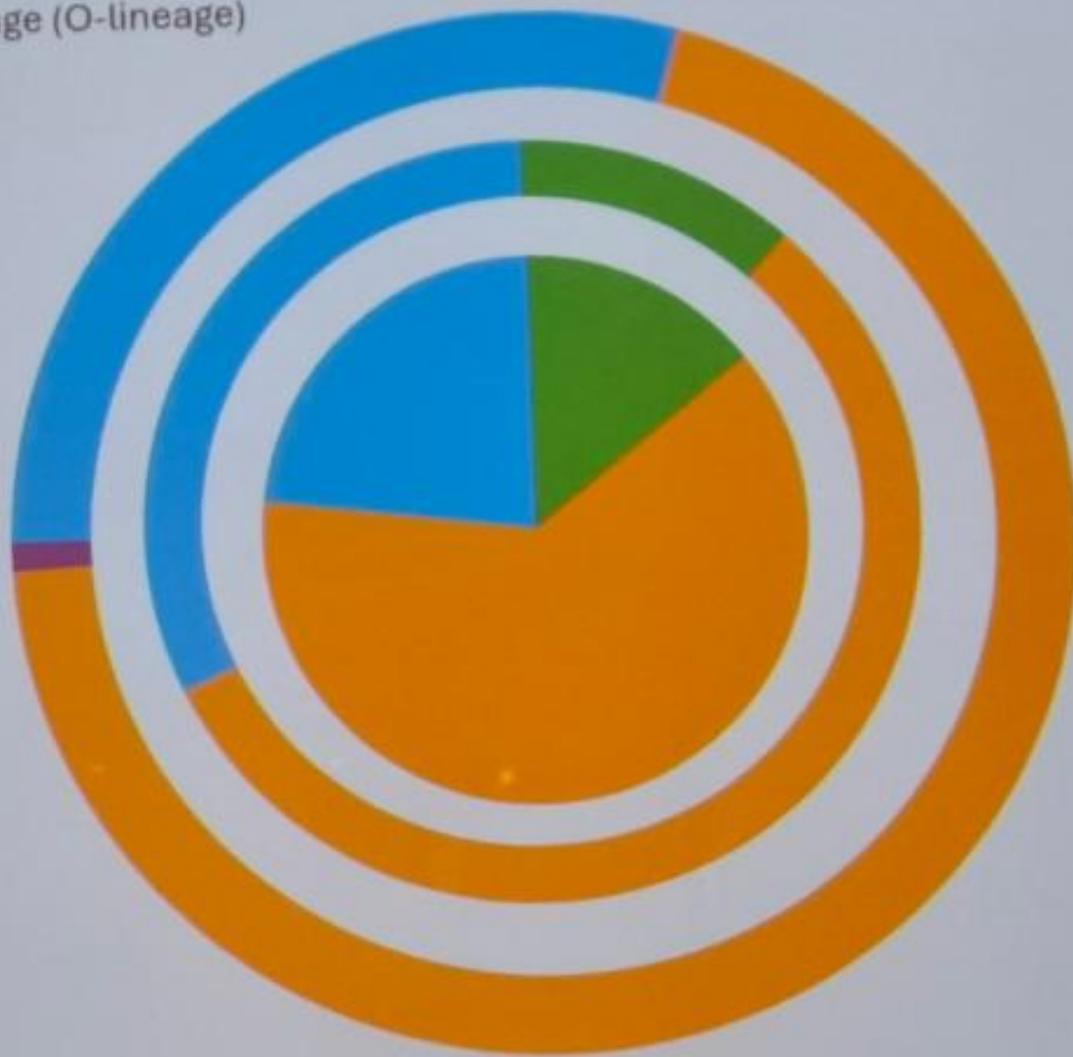
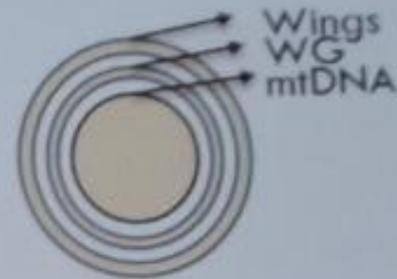
A. m. caucasia

Africanized





- Western European lineage (M-lineage)
- Eastern European lineage (C-lineage)
- African lineage (A-lineage)
- Middle East lineage (O-lineage)



Morphological lineages

Europe

Lineage M

iberiensis

Lineage C

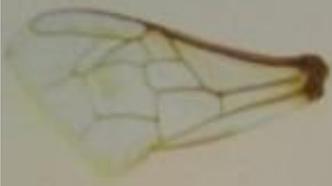
Lineage A

sicilliana
rutneri

Lineage O

cypria

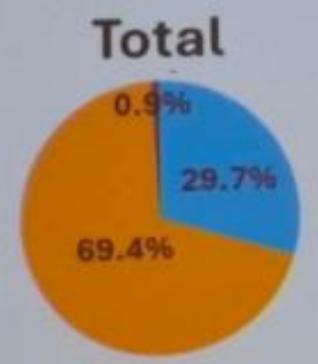




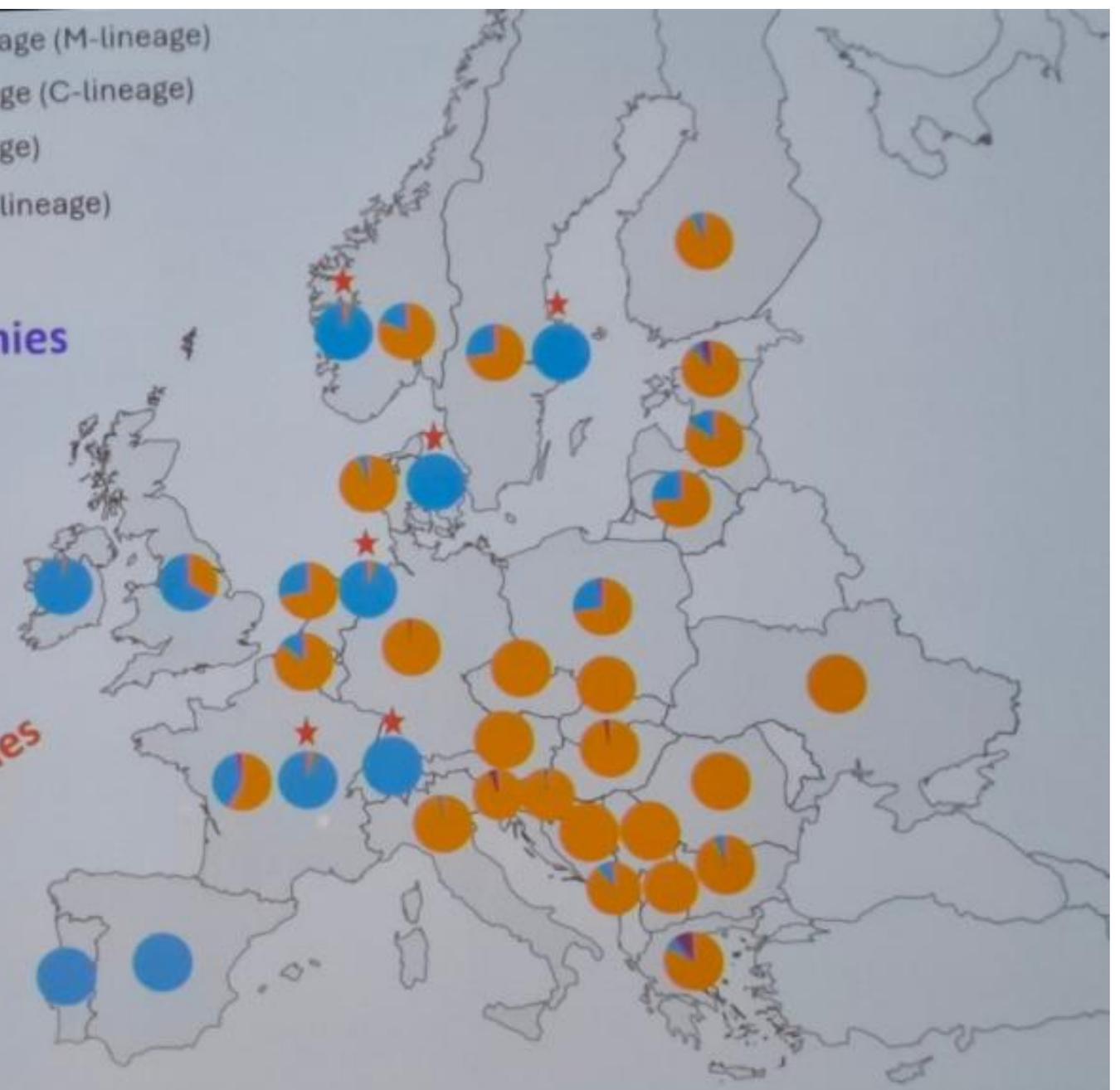
Wing shape variation

- Western European lineage (M-lineage)
- Eastern European lineage (C-lineage)
- African lineage (A-lineage)
- Middle East lineage (O-lineage)

Local colonies



★ Conservation apiaries



Highlights

- ✓ C-lineage largely dominates the genetic landscape in Europe;
- ✓ African mitochondrial DNA variants were found in many countries, suggesting that beekeepers are introducing queens from outside the traditional C-lineage range;
- ✓ *A. m. mellifera* conservation apiaries were dominated by M-lineage ancestry, as determined by the 3 datasets, suggesting that beekeepers are successfully protecting the dark bee;





ADDS VALUE
TO HONEY

ADDS VA
TO HO



DEHYDRATOR

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benka_de

BROODMIN

Science.

ORNETIN
PROTECT BEES

WAX SHREDDER

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BBM Mini

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- Produktivität bis 20 kg/h
- für Hobbyisten und Profis



LITHUANIA

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TECH**
Bienenbrot-

Bee bread harvester
BBM Profi

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- Productivity up to 200 kg/h
- For industrial use

Bienenbrot-Erntemaschine
BBM Profi

- Mit Wachs-
- Produktivität
- Für Industrie



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Aluminium



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2

Optional - ergonomic handles to further reduce load

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3

One Super Lifter for your entire apiary



4



Flow Hive

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Harvested straight from the hive into your jar

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