



New Traceability System for Beekeeping

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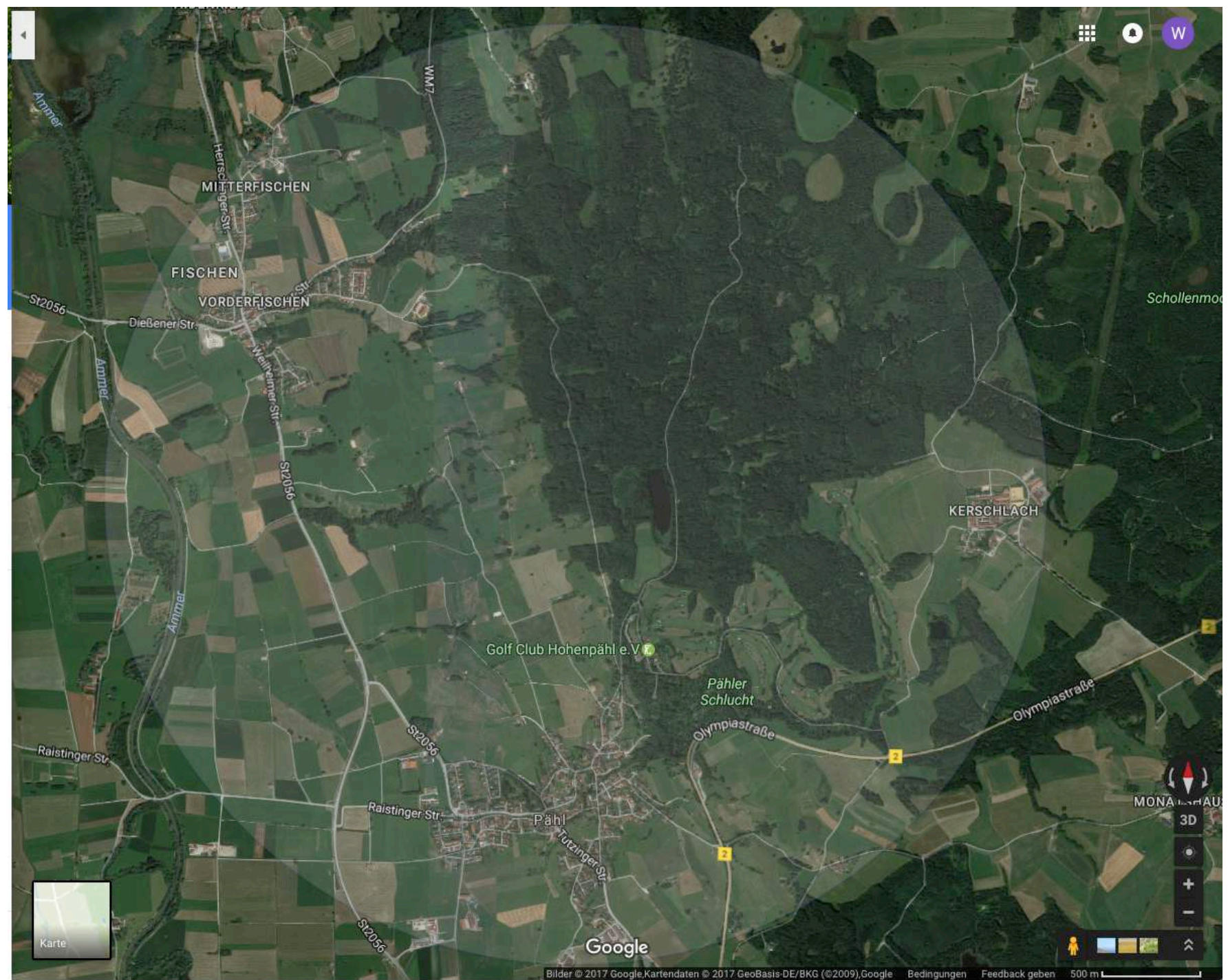


Bees are not kept in a barn or on a fenced in pasture ...





Minimum Foraging Range (3 km radius)



Bees are not flying cows!



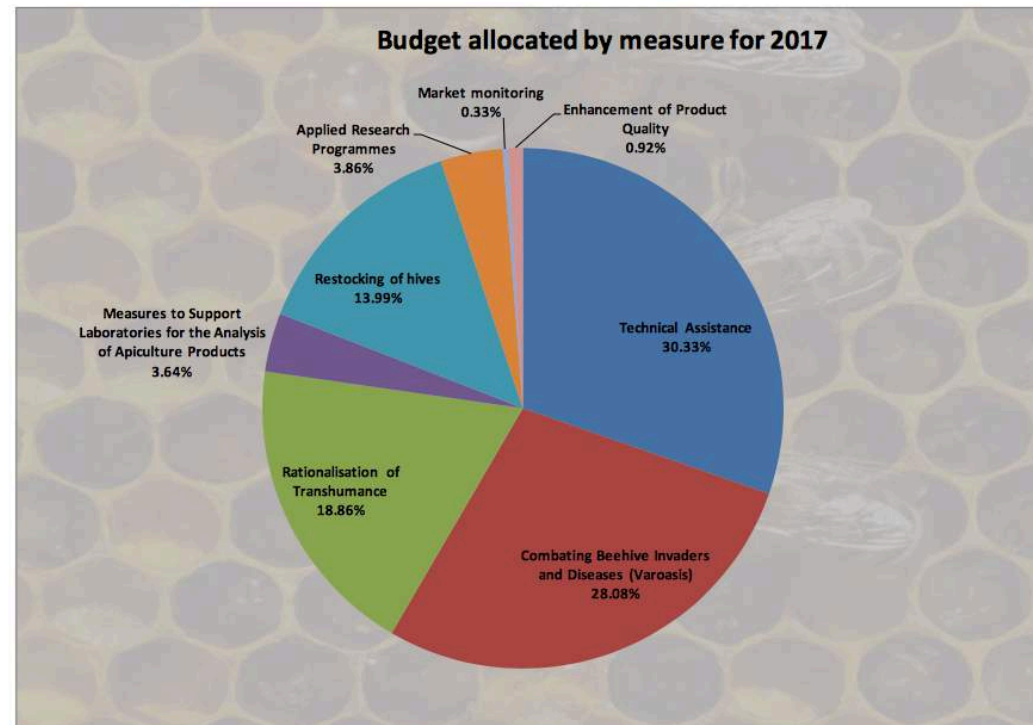
Beekeepers love their bees and their independence.



Beekeepers are not financially dependent on government as farmers



Hives in EU	15.704.270
Beekeepers in EU	606.082
Hives per beekeeper	26
National apiculture €	216.000.000
Spending per hive	14 €
Spending per beekeeper	356 €



source: MS NAP

Incentives to participate in traceability system

- Participation as condition for receiving government support.
 - Money actually received by beekeepers is too insignificant.
- Participation as condition for placing products on the market.
 - Does not work for the many hobby beekeepers.
- Participation may result in valuable expert assistance from government agencies.
 - Not enough practical beekeeping expertise at government agencies to be perceived as valuable assistance.
- Participation may help beekeeper with own needs for record keeping and hive management.
 - More about this later in this presentation ...

Disincentives to participate in traceability system

- Producers in other farming sectors like dairy, pigs, poultry are fully transparent, dependent on government handouts and in terrible financial shape.
 - No desire of the beekeeping sector to follow this example.
- Participation may lead to loss of privacy and independence.
- Tax consequences with arbitrary thresholds.
- Beekeepers forced into farmer's insurance system to compensate for declining number of farmers paying into the pool.
- Draconian measures without sufficient compensation in the case of SHB eradication efforts have reduced trust that authorities will act in beekeepers best interest.
- Governments need data to act. No data is perceived as a good way to keep government out of the sector.

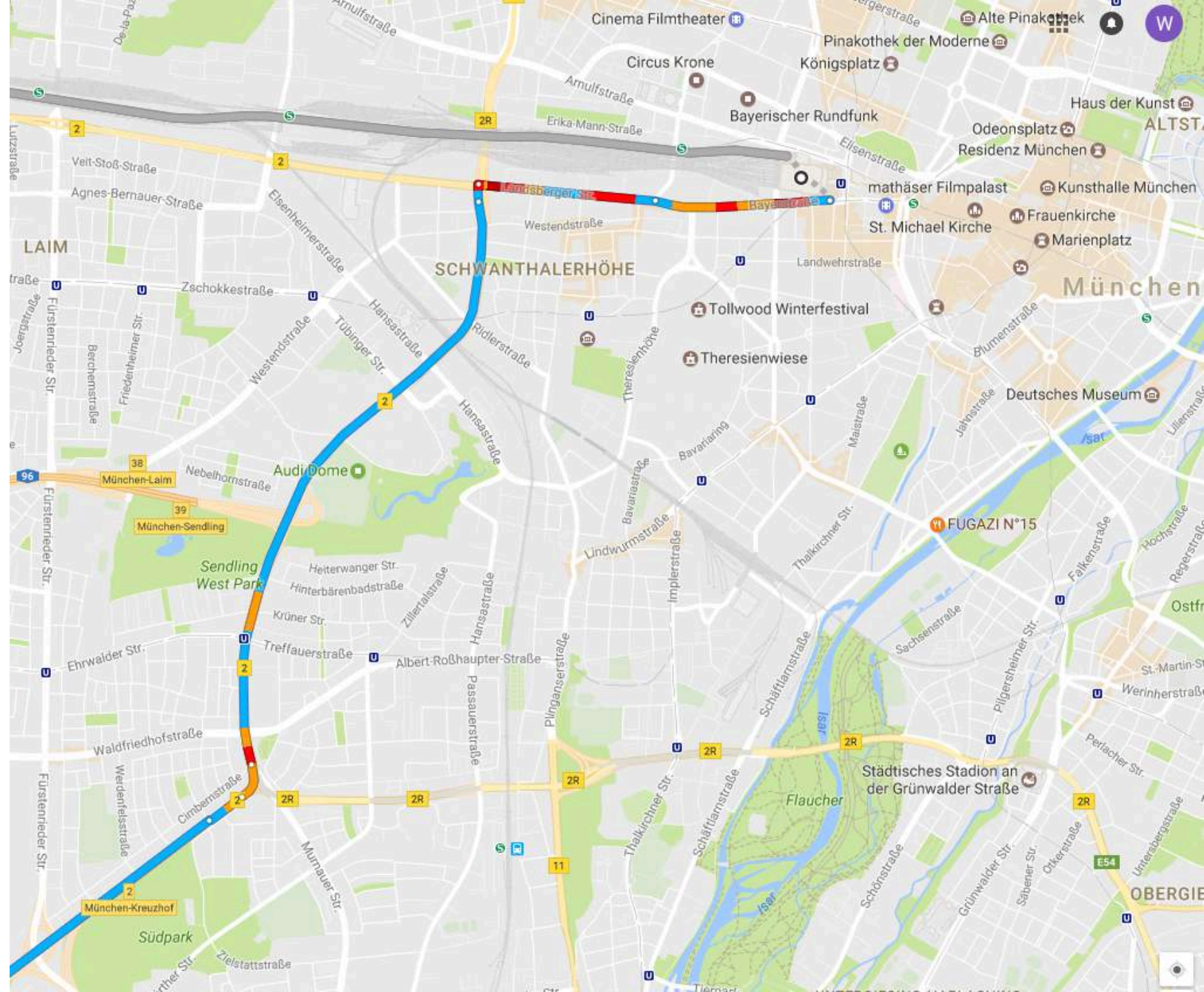
What could a traceability system look like, that beekeepers would love to participate in?

- Focus on the needs of beekeepers first.
 - Beekeepers need to track their hives:
 - location, health status, age of queen, honey production etc.
 - Beekeepers need to track their hive products:
 - inventory, sales, lot numbers, customers etc.
 - Beekeepers need to coordinate certain activities with other beekeepers.
 - varroa treatment, AFB outbreaks, SHB control.
 - Beekeepers need privacy built into the system.
 - Strong encryption with the beekeeper holding the key.
- Clearly define limited needs for data at the government level.
 - Good aggregate data may be sufficient for many functions.
 - Anonymized data may also be sufficient for many purposes.
 - Alerts and notifications can be transmitted to the beekeepers without need to know any personal data.

**Example for useful
data without
privacy invasion:**

Navigation systems

**Aggregate data
from mobile
phones provide
real time traffic
flow without need
to know identity of
user.**



Good example:

- Apple allows users to encrypt data with a key held by the user.
- There is no “master key”.
- System is designed from the ground up to ensure privacy.
- User controls, which data to share.
- User can decide to share anonymized data to improve the system or for other legitimate purposes.



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Arjun Kharpal | @ArjunKharpal

Tuesday, 29 Mar 2016 | 6:34 AM ET



What's next in the privacy debate



CNBC's Dominic Chu and PCMag.com Editor-in-Chief Dan Costa discuss the ongoing privacy debate after investigators broke into an iPhone without Apple's help.

03:56

There is demand for hive tracking systems in the beekeeping community.

Beekeepers will enter accurate and detailed information in systems that provide actual benefits to them and where they own the data.

Beekeepers may agree to make certain data available, if certain conditions are met.

beetight

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Hive tracking and record keeping, online and on mobile.

Beetight is a free web application for beekeepers and is the best way to manage your hives and track them online or on your phone. You'll wonder how you ever survived with the old notebooks and spreadsheets! All hive types are supported, including  Langstroth,  WBC,  Beehaus,  National,  Warre,  Top bar hives.

“Beetight is the future of hive record keeping” – Bee Culture

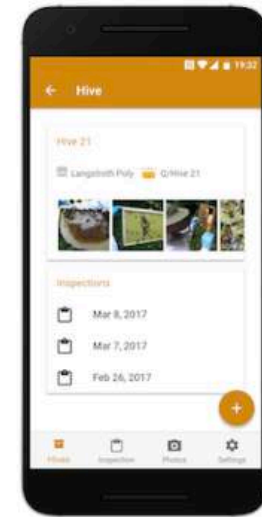
Sign-up now for free

If you have already registered, you can [log in](#).

Beetight mobile

A thousand hives in your pocket

- ★ Free for Beetight Pro users.
- ★ Record new inspections, even when offline.
- ★ Syncs automatically with beetight.com.
- ★ Browse old inspection details.
- ★ Display outstanding tasks for each hive.
- ★ Take and upload inspection photos.
- ★ Scan hive barcodes for instant access.
- ★ Display apiary locations on map.



Easy inspection records

- ★ Easily record details of inspections and manipulations
- ★ Record treatments and feeding
- ★ Track colony temperament
- ★ Record honey harvests, including records of nectar sources and batch codes

Many different systems already exist ...

beetight

HomeAboutRegisterHelp

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Available on the App Store

GET IT ON Google Play

BeeCloud

English

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SIGN UPLOGIN

KNOW YOUR BEES

SAVE TIME AND REDUCE YOUR COSTS
MANAGE YOUR BEEHIVES EFFICIENTLY

MORE MONEY, MORE MONEY!

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AMAZING FEATURES

Know Your Bees

Foster the health and productivity of your honey bees by recording important beekeeping data. Relax, we'll show you exactly what to do regardless of the hive types you use.

View Smart Maps

See where your bees are foraging. We create a map with one, two, and three mile radius rings around your hives allowing you to see the environment encountered by your bees.

Set Reminders

Easily stay on top of what needs to be done next using the to do list and calendar. Never miss those important tasks like feeding, inspections, and queen status updates.

Share Data And Outcomes

Share your data and outcomes with others in your network for the benefit of yourself, other beekeepers, and global bee health.

Go Mobile

The ease and convenience of managing your honey bees on your mobile device has finally arrived. Our responsive web application and native mobile apps for offline work bring the power of mobile to your beekeeping.

Simplify Hive Management

Our easy to use software modernizes your beekeeping processes by keeping track of data, observations, and your equipment inventory.

FEATURES

Take Hive Tracks On The Go

- Data at your fingertips.
- View past inspections by date range.
- Easily keep up with important Queen data.
- View a timeline of your beekeeping activity at a glance.
- See your hives as they really are.

iPhone Users

Android Users

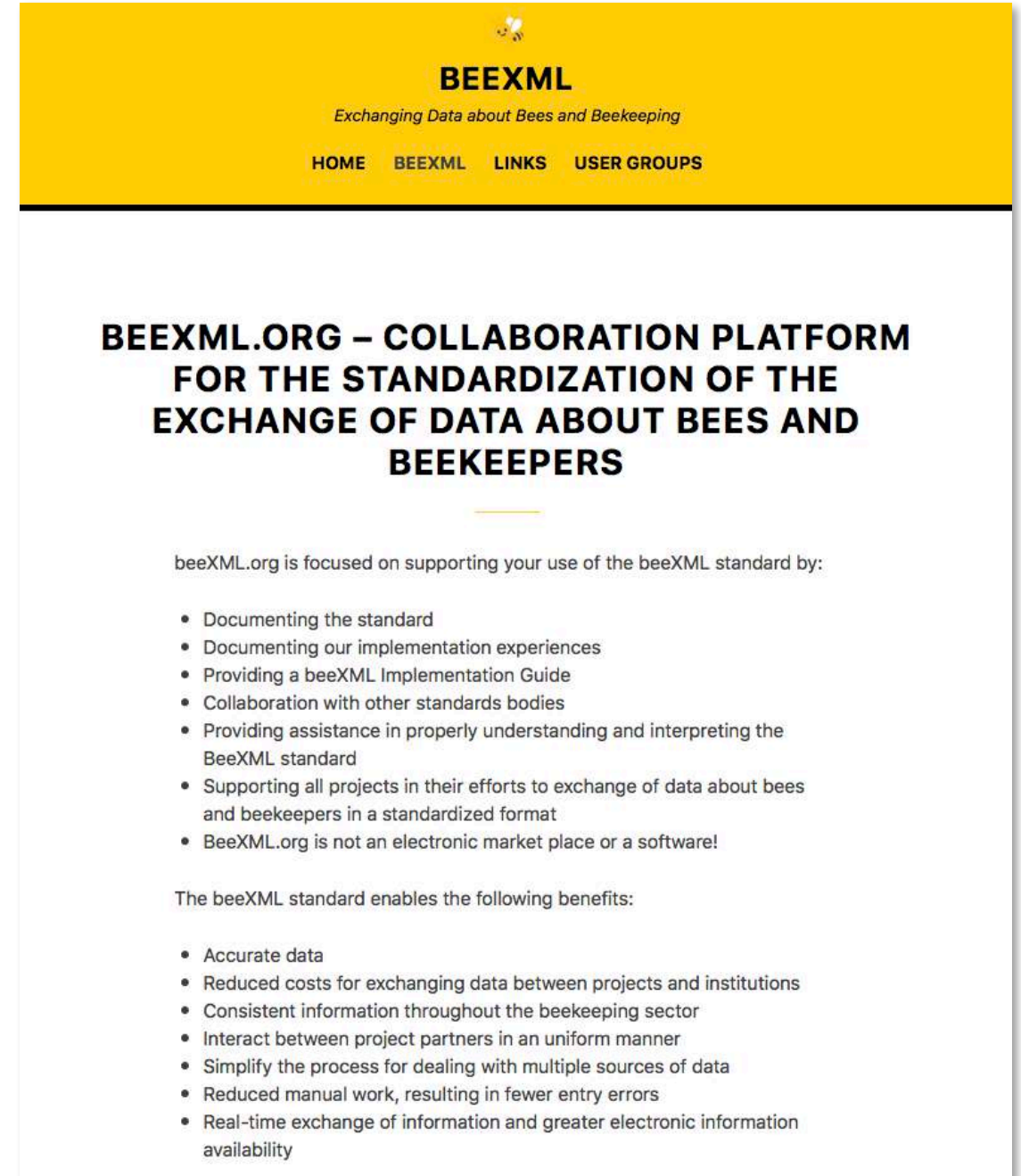
Possible role of authorities:

Promote standardized ways for exchange of data in all systems tracking bees and beekeepers.

- commercial
- veterinary
- administrative
- research

Use advanced technology to avoid “Big Brother” syndrome.

Make all systems open source to allow community to understand and get comfortable with what is being processed.



The screenshot shows the BEEXML website. The header is yellow with a small bee icon, the text "BEEXML", the tagline "Exchanging Data about Bees and Beekeeping", and navigation links: HOME, BEEXML, LINKS, USER GROUPS. The main content area is white and features the title "BEEXML.ORG – COLLABORATION PLATFORM FOR THE STANDARDIZATION OF THE EXCHANGE OF DATA ABOUT BEES AND BEEKEEPERS". Below this, it states "beeXML.org is focused on supporting your use of the beeXML standard by:" followed by a bulleted list of seven items. At the bottom, it says "The beeXML standard enables the following benefits:" followed by another bulleted list of eight items.

BEEXML
Exchanging Data about Bees and Beekeeping

HOME BEEXML LINKS USER GROUPS

**BEEXML.ORG – COLLABORATION PLATFORM
FOR THE STANDARDIZATION OF THE
EXCHANGE OF DATA ABOUT BEES AND
BEEKEEPERS**

beeXML.org is focused on supporting your use of the beeXML standard by:

- Documenting the standard
- Documenting our implementation experiences
- Providing a beeXML Implementation Guide
- Collaboration with other standards bodies
- Providing assistance in properly understanding and interpreting the BeeXML standard
- Supporting all projects in their efforts to exchange of data about bees and beekeepers in a standardized format
- BeeXML.org is not an electronic market place or a software!

The beeXML standard enables the following benefits:

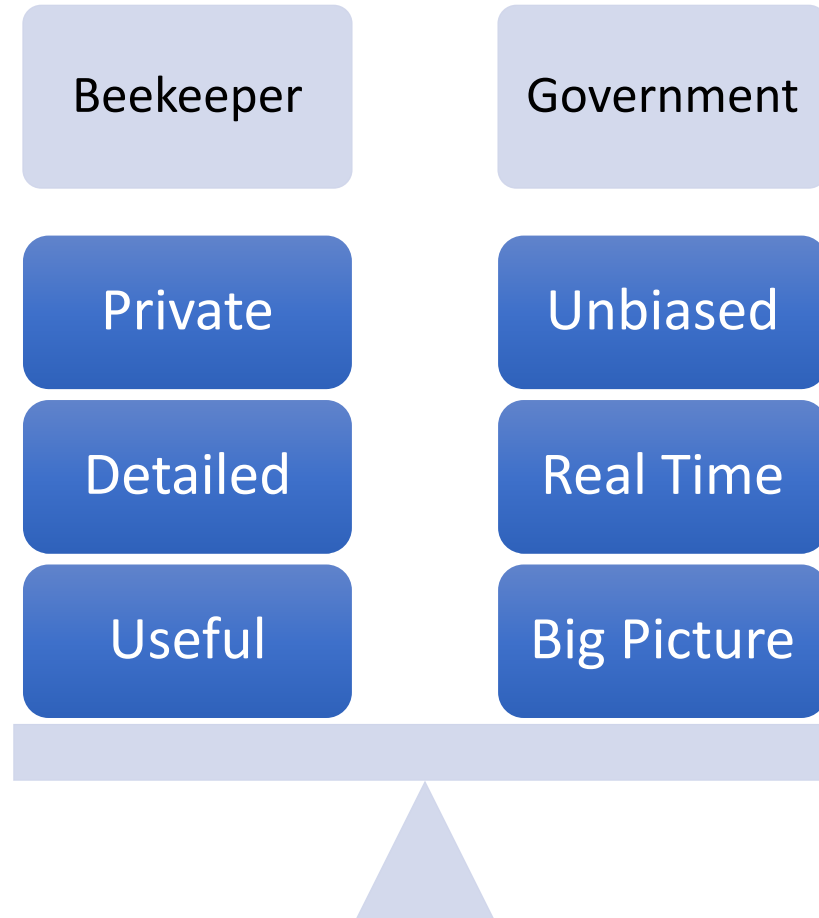
- Accurate data
- Reduced costs for exchanging data between projects and institutions
- Consistent information throughout the beekeeping sector
- Interact between project partners in a uniform manner
- Simplify the process for dealing with multiple sources of data
- Reduced manual work, resulting in fewer entry errors
- Real-time exchange of information and greater electronic information availability

Notification of Beekeepers

How can an anonymous system with encrypted data be used to notify all beekeepers with hives within a certain radius in case of an outbreak?

- A notification bulletin goes out on the whole network.
- When the beekeeper is logged in, his location data are decrypted and matched against all outstanding bulletins.
- The bulletin then informs the beekeeper and provides contact information for the authorities.
- It is not necessary to know any personal data and still can reach out to everybody with hives in the affected area who is using the system.
- This communication is actually based on actual hive locations and not just the postal address of the beekeeper.
- This messaging approach can also be used within the beekeeping community to establish contact with owners of unidentified hives.
- Such a double blind system is already in use in Chile for beekeepers and GMO seed producers.

Striking the right balance



Lessons from my own hive to shelf tracking system. In continuous operation since 2003.

[Sommersummen](#)

Mon Apr 3 10:47:21 2017 Mon Apr 3 10:47:21 2017

Benutzer alexanderh:Alexander Höhn

☐ Werte der ersten Zeile kopieren.

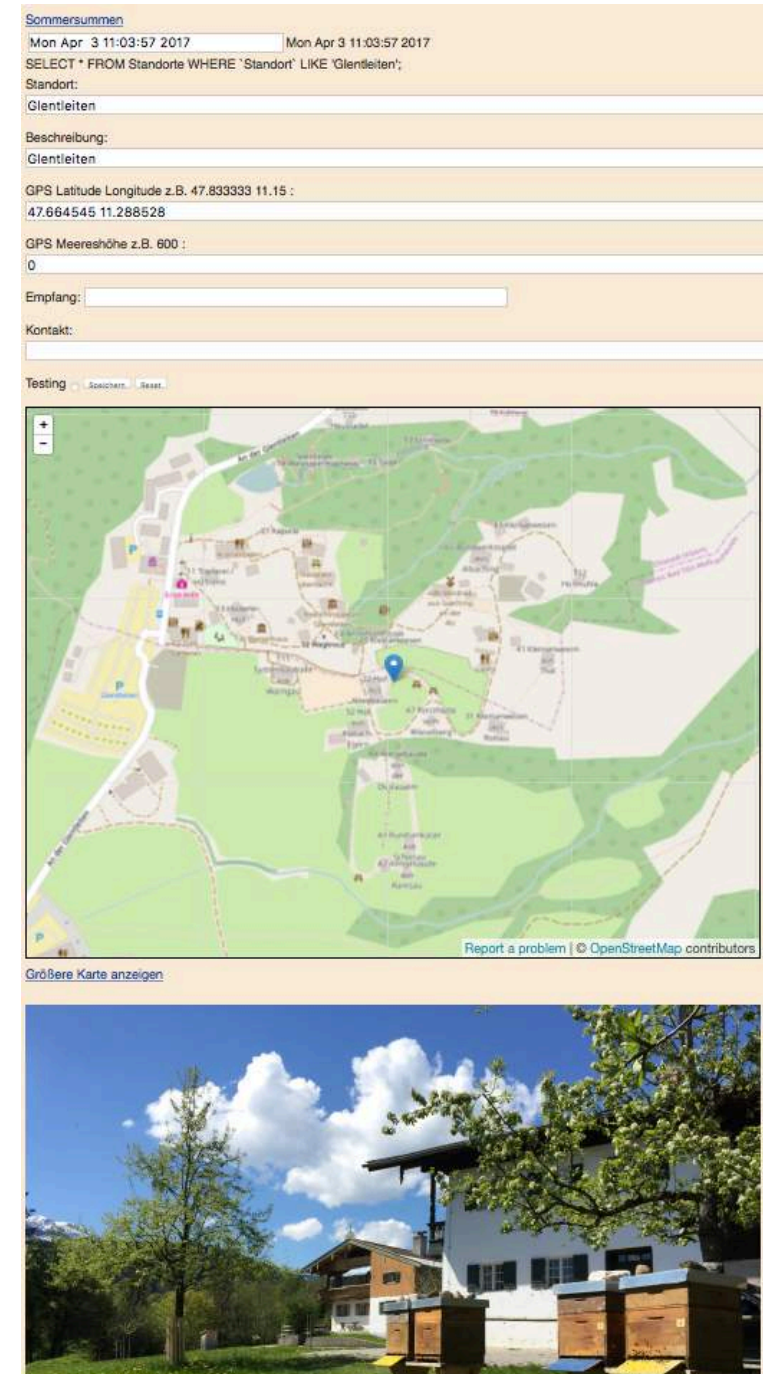
Standort Ammer Wielenbacher Ammerbrücke

Beute	Aktivität	Objekt	Anzahl	Brut	Weisel	Rasse	Jahr	Sanftmut	Waben von Beute	von Standort
17	-	-	0	-	0	-	-	-	0	-
87	-	-	0	-	0	-	-	-	0	-
49	-	-	0	-	0	-	-	-	0	-
7	-	-	0	-	0	-	-	-	0	-
113	-	-	0	-	0	-	-	-	0	-
16	-	-	0	-	0	-	-	-	0	-
3	-	-	0	-	0	-	-	-	0	-
25	-	-	0	-	0	-	-	-	0	-

Testing ☐ Speichern Reset

Hive Tracking

- All brood boxes have unique number.
- All brood boxes are at specific location (apiary or storage).
- Tracking by logging all transactions in SQL-Database.
- Flexible definitions of activities which can be logged.
- Most data entry on per apiary level with exceptions.
- No fancy scanning of hive numbers, since system knows which hives are at each location.
- Full hive history available online.
- Work sheets for helpers.



Pairs of actions on objects

Column	Type
◊ Zeitpunkt	datetime
◊ Beute	bigint(10)
◊ AktivitaetNummer	bigint(20)
◊ TasksID	varchar(255)
◊ Objekt	varchar(255)
◊ Standort	varchar(255)
◊ Beschreibung	varchar(255)
◊ Standort2	varchar(255)
◊ Beute2	bigint(10)
◊ Anzahl	int(5)
◊ Status	varchar(255)
◊ Waben	decimal(2,0)
◊ Sanftmut	varchar(12)
◊ Erinnerung	varchar(255)
◊ Erledigt	varchar(255)
◊ Weiselnummer	int(11)
◊ WeiselJahr	decimal(4,0)
◊ Rasse	varchar(12)
◊ UserID	varchar(20)

TasksID
Ableger
Abnehmen
Anbrüter
Ankauf
Auflösung
Aufsetzen
Behandlung
Durchsicht
Entnahme
Erfassung
Freigabe
Inventur
Kontrolle
Schleudern
Schwarm
Teilung
Umbau
Verkauf
Verlust
Verstellen
Wanderung
Winterbehandlung
Zugabe

Objekt
Ableger
Absperrgitter
Anbrüter
Anflugbrett
Apilnvert
Baurahmen
Beute
Bienenflucht
Bienenflucht+HR
BioApiinvert
Biozucker
Biozuckerlösung
Brutwaben
Drohnenbrut
Fütterer
Futterwabe
Honig
Honigraum
Honigwaben
Jungbienen
Königin
Leerrahmen
Medizinflasche
MiniPlus
Mittelwände
Oxalsäure träufeln
Seramis
Volk
Weiselzelle
Zuchtleiste

Zeitpunkt	Beute	AktivitaetNummer	TasksID	Objekt	Standort	Beschreibung
2016-04-04 18:37:56	72	12964	Aufsetzen	Honigraum	Kerschlach	Winterfutter raus. Eingengt auf 6...

Product Tracking

- All batches of honey have lot number.
- All lot numbers are associated with honey harvested from specific locations.
- Tracking by logging all transactions in SQL-Database.
- All extraction, filling of containers are logged in database.
- All inventory transactions and sales are logged in database.
- Delivery to stores is logged in database.
- Stores receive electronic delivery notice.
- PDF-Invoices are generated by system.

Product Tracking

Sommersummen

Mon Apr 3 11:30:49 2017

Inventurdaten: 2016-10

Losnummer	Sorte	SchleuderDatum	Herkunft	Wassergehalt	Menge	Beschreibung	Ausverkauft	Geschleudert	Zertifiziert	Conductivity	Hives	MHD	RabattAnwenden
06-2015	Waldhonig	2015-06-30	Oderding Dießen WM MR	15.6	1379	Waldhonig		J	D-BY-006-44625-A	0	145	2018-02-02	0

Geschleuderte Menge oder Anfangsbestand: 1379

YYYY	MM	Kundennummer	Losnummer	Gebinde	sum('Menge')
2016	7	1000	06-2015	250	4344

Abgefüllte Menge: 1086

YYYY	MM	Kundennummer	Losnummer	Gebinde	sum('Menge')
2016	7	2	06-2015	250	4152

Verkaufte Menge im Glas: 1038

Verkaufte Menge im Hobbock oder als Waben: 0

YYYY	MM	Kundennummer	Losnummer	Gebinde	sum('Menge')
2016	10	1000	06-2015	250	216
2016	10	1000	06-2015	Kg	287

Menge im Lager: 341

Auswertung

KG_geschleudert	1379
KG_abgefüllt	1086
KG_verkauft im Glas	1038
KG_verkauft im Hobbock oder als Waben	0
KG_im_Lager	341
KG accounted for	1379

Auswertung 06-2015 hat Delta 0

Auswertung Kg Gebinde

Datum / Uhrzeit	Transaktion	Menge	Bestand	Info
2016-10-08 07:37:56	Inventur	287.00	287.00	287

Auswertung 50 g Gebinde

Datum / Uhrzeit	Transaktion	Menge	Bestand	Info
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Auswertung 125 g Gebinde

Datum / Uhrzeit	Transaktion	Menge	Bestand	Info
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Auswertung 225 g Gebinde

Datum / Uhrzeit	Transaktion	Menge	Bestand	Info
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Auswertung 250 g Gebinde

Datum / Uhrzeit	Transaktion	Menge	Bestand	Info
2015-12-28 07:39:56	Abfuellung	3.00	3.00	
2015-12-28 20:39:56	Lieferung	-3.00	0.00	Kundennr. 2 29/2015
2016-01-31 06:08:56	Abfuellung	99.00	99.00	
2016-01-31 16:08:56	Lieferung	-99.00	0.00	Kundennr. 2 01/2016
2016-07-13 07:00:00	Abfuellung	345.00	345.00	
2016-07-13 17:00:00	Lieferung	-345.00	0.00	Kundennr. 2 06-2016
2016-07-21 07:00:00	Abfuellung	99.00	99.00	
2016-07-21 17:00:00	Lieferung	-99.00	0.00	Kundennr. 2 07-2016
2016-07-31 07:00:00	Abfuellung	492.00	492.00	
2016-07-31 17:00:00	Lieferung	-492.00	0.00	Kundennr. 2 08-2016
2016-08-21 07:00:00	Abfuellung	48.00	48.00	
2016-10-08 07:37:56	Inventur	54.00	102.00	54

Conclusions

- **Hive and hive product tracking is essential to any well run beekeeping operation.**
- **Such a system is only useful to the beekeeper, if it contains accurate and current data.**
- **Incentives and disincentives to have “alternate facts” in the system make it useless for everybody.**
- **Beekeeping community and authorities should work together balance beekeepers interests with legitimate government interests.**
- **Systems need to be designed to have built in privacy protections which do not depend on trusting current or future governments.**
- **Commercial suppliers of hive tracking systems need to be included in the process.**
- **At minimum standard data formats are needed (BeeXML).**



Thank you for your kind attention!

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