mellifera.ch
magazin

Februar 2014

proceedings and reports

SICAMM Conference 2012, Landquart, Switzerland

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Contents

Link:
www.sicamm.org/documents/2012_proceedings.pdf

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Editorial

Dear Mellifera Friends

More than one year has passed since the SICAMM Conference 2012; we now have the great pleasure to present the corresponding proceedings. According to many comments and compliments we received, it was a good conference with a very agreeable atmosphere. The 2½ days with very interesting papers were as well accepted as the accompanying program. Such a result is only possible if one can count on many volunteers who cooperated to the benefit of Mellifera friends. Participants came to the Plantahof in Landquart from over 10 European countries. To all of them a cordial thank you.
For the first time in the history of SICAMM Conferences we were able to offer simultaneous translation from German to English and in some instances even from French to English. This was only possible thanks to governmental and private funding. We are thankful to these agencies, too.
We are not fully happy that from the 30 presented papers only about a dozen articles were submitted for publishing in the proceedings at hand. But we assume that quality is more important than quantity and we sincerely thank all those who took the trouble to send us their contribution in time. The articles are presented in their original language. We count on your understanding for not having translated them in another language.
We would also like to thank all attendees for joining us to spend a few unforgettable days in the Mellifera family circle and we hope that returning home you had your luggage full of ideas on how to progress "TOWARDS A BRIGHT FUTURE WITH THE DARK BEE"!

Liebe Mellifera Freunde

Mehr als ein Jahr ist seit der SICAMM Konferenz 2012 verflossen; wir freuen uns nun sehr, hiermit zusammenfassend Vorträge davon zu unterbreiten. Vielen Kommentaren und Komplimenten entnehmen wir, dass es eine gute Konferenz in einer sehr angenehmen Atmosphäre war. Die 2½ Tage mit sehr interessanten Vorträgen wurden genau so gut geschätzt wie das Begleitprogramm. So ein Resultat ist nur möglich, wenn man auf viele Freiwillige zählen kann, die sich zum Wohle der Mellifera Freunde einsetzen. Aus über 10 europäischen Ländern kamen die Teilnehmer nach Landquart in den Plantahof. Allen einen herzlichen Dank.
Zum ersten Mal in der Geschichte der SICAMM Konferenzen waren wir in der Lage Simultanübersetzung von Deutsch ins Englische und umgekehrt, sowie in einigen Fällen sogar von Französisch ins Englische anzubieten.
Dies war nur möglich dank öffentlicher und privater Unterstützung. Wir sind diesen Institutionen dafür auch sehr dankbar.
Wir sind nicht ganz glücklich, dass von 30 Vorträgen nur etwa ein Dutzend Artikel für diese Publikation eingegangen sind. Uns ist Qualität wichtiger als Quantität und wir danken allen, die sich die Mühe gaben und ihre Beiträge zeitig zukommen liessen. Die Artikel werden in der Originalsprache erscheinen. Wir zählen auf Ihr Verständnis, diese nicht in eine andere Sprache übersetzt zu haben.
Wir danken auch allen Besuchern für ihr Kommen, um im Mellifera Familienkreis ein paar unvergessliche Tage zu verbringen und hoffen, dass bei der Rückkehr ihr Gepäck voll Ideen war, wie weiter zu machen «Für eine glänzende Zukunft mit der Dunklen Biene»

Chers amis des abeilles noires

Plus d'un an a écoulé depuis la conférence SICAMM du 2012 et nous nous réjouissons beaucoup de pouvoir vous présenter ci-joint les résumés des conférences. Selon les commentaires et les compliments reçus nous constatons qu'il s'agissait d'une bonne conférence dans une atmosphère très agréable. On a apprécié ces deux jours et demi avec des conférences très intéressantes et un programme d'accompagnement bien réussi.
Un tel résultat n'est possible que grâce à beaucoup de volontaires qui s'engagent pour les amis des abeilles noires. Des participants de 10 pays européens sont venus au Plantahof à Landquart. Un grand merci à tous !
Pour la première fois dans l'histoire des conférences SICAMM nous avons pu offrir des traductions simultanées de l'allemand en anglais et vice versa, et en quelques cas même du français en anglais. Ceci a été possible grâce à des allocations gouvernementales et privées.
Nous en sommes très reconnaissants à ces institutions!
Malheureusement sur une trentaine de conférences nous n'avons reçu qu'une douzaine d'articles pour cette publication. Mais comme la qualité compte plus que la quantité nous remercions tous ceux qui se sont engagés et nous ont envoyé à temps leur contribution. Les articles se publient dans la langue originale. On compte sur votre compréhension de ne pas les avoir traduits en d'autres langues.
Nous remercions tous les visiteurs de se joindre aux amis des abeilles noires pour passer ensemble quelques jours inoubliables et nous espérons qu'au retour leur bagage était plein d'idées pour « Un avenir glorieux des abeilles noires » !

Agricultural College Plantahof | Landwirtschaftliche Schule Plantahof

Balser Fried and Padruot Fried, Project Leaders SICAMM conference 2012

Dorian J. Pritchard, BSc, Dip Gen, PhD **dorian.pritchard@btinternet.com**
Saturday, 1st September 2012 9.00

Presidential Welcome

Good morning ladies and gentlemen;
Guten Morgen meine Damen und Herren;
Bonjour mesdames et messieurs.

As President of SICAMM it is my privileged duty to welcome you all to this great occasion: the first SICAMM conference in Switzerland.

SICAMM, which stands for "Societas Internationalis pro Conservatione Apis Melliferae Melliferae" - the International Association for Protection of the European Dark Bee - was initiated by Nils Drivdal in Norway in the early 1990s, to counter the threat he saw to his own dark bees. At that first conference, with the cooperation of local beekeepers, they succeeded in defining a protected area for the local Dark Honey Bee.

There have been many other significant contributions to Dark Bee conservation. On the island of Laesø in Denmark, Andrew Abrahams and I both delivered broadcasts on prime-time television national news, which contributed to the establishment by Ole Hertz, of conservation populations of the Laesø bee on other Danish islands.

At the Versailles conference, we assembled representatives of the ten or so French native bee conservation groups for the first time ever, which led to the production of the first comprehensive publication on French native honey bees.

In Moscow, we initiated collaborative research between the Russians and Lionel Garnery's genetics research group in France, which we hope will eventually result in integration of the vast numbers of Russian bees into Lionel's evolutionary tree for Western Europe.

In Britain we have pushed back the probable date of arrival of Apis mellifera to our islands by some 7000 years, which could eventually alter its legal status in Britain and so afford it protection in law.

Our founding President, Josef Stark, was an outstandingly original scientist. It was his bees passing a radiation monitor at their hive entrance that alerted the world to radioactive fallout from the Chernobyl explosion. Josef's untimely death in 2004 is now commemorated by an award to young beekeepers who are making significant contributions to honey bee conservation. At this conference we will hear a presentation by its latest recipient, Eoghan MacGiolla Coda, who is now building strongly on the magnificent achievements of his father, Michéal, in consolidating the position of Apis mellifera mellifera in the Irish Republic.

For the first time at a SICAMM conference, we will hear a contribution from Tasmania, where the British native honey bee was taken nearly two centuries ago by British settlers and, in a departure from tradition, we welcome a speaker from Macedonia, where the native subspecies is not mellifera, but macedonica.

We will also learn of new approaches to the selection and breeding of high performance queens, of the relative roles of genotype and environment and of the value of instrumental insemination in maintaining pure lines. We will learn how to foresee and avoid the problems that accompany inbreeding and of many other aspects of honey bee conservation taking place across Europe. Perhaps most exciting of all are the research visits and superb excursions through some of the most magnificent scenery in Europe.

On behalf of SICAMM, I therefore take great pleasure in welcoming you all to what promises to be a superb conference, convened for the first time by Swiss Mellifera Bee Friends Association, VSMB. We hope you have an enjoyable and truly memorable experience and will return home fired with enthusiasm to continue to conserve and promote that most valued of all our insects, the native Dark Bee of Northern Europe.

Thank you.
Dorian Pritchard President of SICAMM

Valentin Luzi, dipl ing. agr ETH, Abteilungsleiter Agrarmassnahmen Amt für Landwirtschaft und Geoinformation
Saturday, 1st September 2012 9.00 **valentin.luzi@alg.gr.ch**

Begrüssung Kanton Graubünden

Sehr geehrter Präsident,
sehr geehrter Tagespräsident
Geschätzt Imkerinnen und Imker
Sehr verehrte Gäste.

Mit den Titeln und der Begrüssung halten wir es in der Schweiz einfach und direkt, damit wir gleich bei der Sache sind. Im Namen der Regierung des Kantons Graubünden darf ich Sie hier an der Landwirtschaftlichen Schule Plantahof herzlich willkommen heissen. Der Plantahof ist die geistige Heimat für die Landwirtschaft im Kanton Graubünden und geniesst in der Schweiz einen ausgezeichneten Ruf als Schule, die die Zeichen der Zeit erkennt, offen ist für Neues und in der Weiterbildung sehr aktiv ist.

Ich habe Sie begrüsst im Namen der Regierung. Ich selber bin nicht in der Regierung, sondern ein Mann der Verwaltung, verantwortlich für die Agrarmassnahmen. D.h. Umsetzung der Förderungsbeiträge des Bundes, Einsatz der kantonalen Fördermassnahmen zur Unterstützung der Innovationen in der Landwirtschaft und der ersten Verarbeitungsstufe im Lebensmittelbereich sowie die Kontrolle im Primärsektor. Ein Vertreter der Regierung kann nicht anwesend sein, weil sie heute an der Feier des Parlamentspräsidenten teilnehmen. Ein Tag, an dem kein Regierungsrat eine andere Verpflichtung annehmen darf.

Wir heissen Sie herzlich willkommen, weil wir Sie und Ihre Organisation brauchen – ja auf Sie angewiesen sind, damit die Dunkle Biene, ein altes Kulturgut, erhalten bleibt. Wir und unsere Nachfahren sind auf die genetische Vielfalt angewiesen. Im Kanton Graubünden gehört die Hälfte der Bienen der Rasse der Melifera an. Graubünden mit den 150 Tälern, wäre der geeignete Ort, Reinzuchten zu fördern. Die bisherigen Erfolge in dieser Richtung sind bis heute bescheiden geblieben. Alleine das Münstertal hat sich entschieden, die Dunkle Biene in Reinzucht zu fördern, die hängt zusammen mit der Ausschied als Biosphärenreservat. In das Konzept passt die Bienenrasse ausgezeichnet.

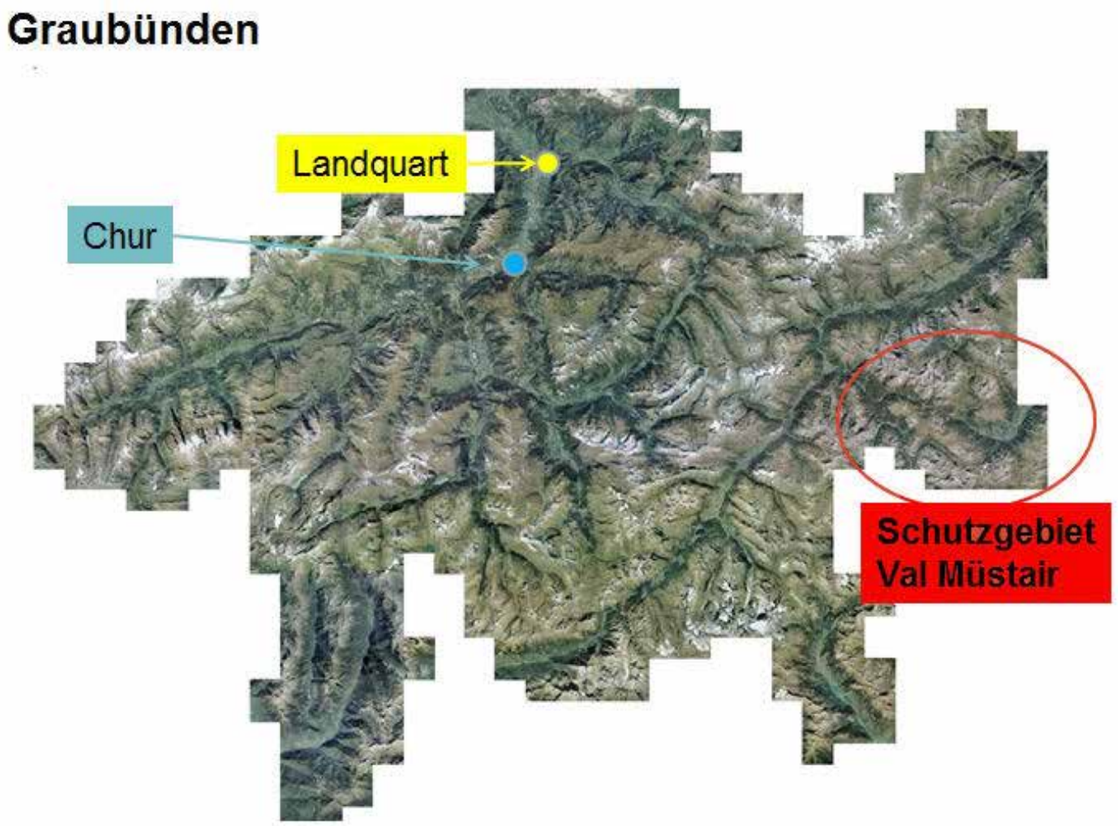
Sie haben einen Tagungsort ausgesucht, der in einem Kanton liegt, dessen Gebiet quer durch die Alpen geht und entsprechend von Gebirge geprägt ist. 70 % der Oberfläche ist unproduktiv, Wald und Gewässer 8 % ist landwirtschaftliche Nutzfläche und 22% sind Alpweiden.

Im Kanton sind 8 % in der Land und Forstwortschaft tätig, 30 % im Tourismus, 20 % in Gewerbe und Industrie und der Rest im Dienstleitungssektor.

Wenn man die Bevölkerung beschreiben möchte, so kann man von den Eigenschaften der Dunklen Biene ausgehen, wie Sie sie auf Ihrer Website beschreiben. Die Bevölkerung ist von den Bergen geprägt.

- Grosse Winterhärte und Kälteresistenz: Mit drei bis sieben Monaten Schnee müssen sich die Leute an Schnee und Kälte gewöhnen.
- Geringe Schwarmneigung: Das trifft eher weniger zu. Die Bündner sind schon immer in die Ferne gezogen und haben gute Ideen zurückgebracht, sei das nach Italien Frankreich, England oder gar nach Russland, bevor man auf Übersee reisen konnte. Jeder Bündner muss in seinen Generationen nicht weit suchen bis er eine oder mehrere Personen mit ausländischer Herkunft findet.
- Ausgeprägte Sanftmut: Der Bündner ist dank dem Tourismus offen für Neues, Prüft es und wenn wer überzeugt ist, setzt er es um.
- Vorsichtig flacher Brutrhythmus: Die Zeit der Grossfamilien ist vorbei. In den Bergtälern gehen die Bevölkerungszahlen zurück in den Agglomerationen und den Tourismuszentren nehmen sie zu.
- starker Pollensammeltrieb: Man darf die Bündner zu den fleissigen Europäern zählen. Sie haben dieses Frühjahr die Initiative fünf statt vier Wochen Ferien abgelehnt.
- Hohe Langlebigkeit: Wie auch andernorts wird die Bevölkerung immer älter. Altersheime werden gebaut und Schulhäuser werden umgenutzt.
- Ausgeprägte Flugkraft: Die Bevölkerung ist arbeitswillig und die Wirtschaft gibt vielen Arbeitenden aus dem Ausland Gelegenheit hier zu arbeiten. Die Arbeitslosigkeit liegt bei ca. 3 % und tiefer.
- Flüchtiger Wabensitz: Dies trifft auch weniger zu. Gegenwärtig wird mit dem tiefen Zinssatz von 1,4 % sehr viel gebaut. Die Stabilität der Bauten sind auf mehrere hundert Jahre ausgelegt.

Zum Abschluss meines Begrüssungsreferates möchte ich wieder auf die Dunkle Biene zurückkommen. Sie haben einen Tagungsort ausgesucht in dessen Gebiet die Reinzucht der Dunklen Biene möglich wäre. Die Schweiz hat zur Förderung der Zucht neue Massnahmen ergriffen. Auf Initiative einer Parlamentarierin aus Graubünden ist die Schweiz bereit das Herdebuch der Bienen finanziell zu unterstützen. Damit kann die Zuchtarbeit der Rassenherdebücher massiv unterstützt werden mit einem funktionierenden Herdebuch kann strukturiert Zucht betrieben werden. Gleich im Nachbardorf ist eine Prüfzuchtstation geplant. Dies ist unseres Erachtens nötig für eine gezielte Zucht. Die Arbeit wird auch vom Bienenberater der Schule unterstützt.



Die Voraussetzungen des Staates zur Förderung der Dunklen Biene in der Schweiz sind gegeben. Ebenfalls Organisationen wie die Pro Specie Rara, Slow Food und einer der zwei Grossverteiler, nämlich Coop fördern setzen sich für den Absatz des Honig der Dunklen Biene ein. Graubünden würde sich für eine Reinzucht und Produktion besonders eignen, weil bereits 50 % der Bienen der Dunklen Rasse angehören, der Kanton in 150 Täler aufgeteilt ist, 53 % der Landwirtschaftsbetriebe biologisch produzieren und beinahe aller Honig nach der Berg und Alpverordnung mit dem speziellen Label verkauft werden könnten.

Wie eingangs gesagt, erfüllt Ihre Organisation unseres Erachtens eine wichtige Aufgabe. Sie setzen sich ein für die Erhaltung und Zucht der Dunklen Biene. Damit verfolgen Sie ein nachhaltiges Ziel, keine kurzfristige Gewinnsucht. Nachhaltigkeit ist keine Einbahnstrasse, man muss den Fächer öffnen und mehrere Ziele gemeinsam im Auge behalten. Das fordert eine Zuchtleitung. Beim Züchten geht es um das Ziehen und nicht nur um ein geselliges Zusammensein.

Im Namen der Regierung wünsche ich Ihnen eindrückliche, lehrreiche aber auch gesellige Stunden in unserem Kanton Graubünden. Es gibt vieles zu geniessen, ergreifen Sie die Gelegenheit.

Valentin Luzi, dipl ing. agr ETH, Abteilungsleiter Agrarmassnahmen im Amt für Landwirtschaft und Geoinformation

Peter Gallmann, Head of Swiss Bee Research Institute, Leiter ZBF, Bern **peter.gallmann@alp.admin.ch**
Saturday, 1st September 2012 9.00

Dear Friends of the Dark Bees
Liebe Freunde der Dunklen Biene

Active breeding of honey bee queens together with selection are important keys for successful beekeeping in Switzerland. For a long time public as well as private funding has neglected this reality. As a matter of fact the breeding program at the Swiss Bee Research Institute was cancelled a long time ago and much local knowledge and know-how has been lost since. However, a different attitude towards bees and beekeeping changed this: The honeybee was formally recognized as a farm animal, in addition the Dark Bee was rated an endangered breed. This happened in view of the possibility of disease resistances.

We now can offer all bee breeding organizations scientific support for their breeding efforts. For the time being this is: Analyses of traits with classical genetic methods, structure and relatedness of populations as well as genetic diversity. Our efforts go towards genetic selection of small and closed populations and questions around the preservation of endangered populations. This is an urgent concern because of the disappearance of feral honeybees owing to the Varroa mite.

In order to secure access to modern equipment and up to date knowledge we have joined the «Swiss animal Breeding Technology Platform (SABRE-TP). This external expertise joined with our own capabilities makes use of synergies and will be advantageous for the topic of breeding honeybee queens.

The Swiss Bee Research Institute welcomes the efforts of SICAMM and recognizes especially the important role of the Dark Bee Society in Switzerland (VSMB). I am pleased to participate personally at the conference and hope for many contacts and interesting talks with professional colleagues.

Peter Gallmann

Balser Fried, Project Leader SICAMM conference 2012
Saturday, 1st September 2012 9.00

Dear Beekeepers
Dear Guests

On behalf of the Swiss Mellifera Bee Friends and the organizing committee I give you a heartfelt welcome to the 10th Sicamm conference here at the Plantahof in Landquart.

Ich begrüsse Sie ganz herzlich im Namen des Vereins Schweizerischer Mellifera Bienenfreunde und des Organisations-Komitees zur 10. Sicamm Konferenz hier am Plantahof in Landquart.

Chers amis de l'abeille noire, je vous salue cordialement et je vous souhaite la bienvenue au nom des Amis Suisses de l'abeille noire ici au Plantahof à Landquart.

Ün cordial bainvgnü eir ad amis ed amias da l'aviöl nair a la 10avla conferenza da la Sicamm quia al Plantahof a Landquart.

After attending many successful conferences in other countries, it is now a very special pleasure for me to greet the Sicamm community here in Switzerland. Beekeepers from 11 countries have joined us today, among them for the first time colleagues from Macedonia and the Czech Republic, to whom I would like to give a special welcome. The Sicamm family is growing in size and thus also in importance. This is significant because, as we all know, our bees are under growing pressure, but not yet all of our fellow men are aware of the importance of maintaining biodiversity.

This present conference will make a contribution to insure a bright future for our unique dark bee.

For the first time at a Sicamm conference we are offering simultaneous translation English-German and vice versa, in order to give as many beekeepers as possible a chance to make their contribution and to receive new inputs. The translation will be especially helpful in our discussions, and I give a special greeting to our interpreters Annette von Lerber and Ramos Pedragosa. I suppose it is this offering which has led to an especially large attendance of German-speaking guests. We would have liked to offer French translation as well, but the interest was not substantial enough and our funds are very limited.

Mais c›est un grand plaisir pour moi de voir que quelques apiculteurs de la France sont venus chez nous tout de même.

I hope you enjoyed the excursions yesterday and they gave you an impression of the diversity of our country as an introduction to these conference days. We will have three days of intense discussions about how to ensure «a bright future for the dark bee.» I am glad we succeeded in attracting well-known specialists and experienced beekeepers as speakers; thus, we are looking forward to a few interesting days.

I feel confident that our bee will have a bright future if the quality of the colonies is right. Quality in this case is nothing other than conforming to the breeding goals, and breeding goals can be different. It is important to implement consistently what has been decided as the goal. There may be more progressive or more cautiously conservative approaches. All of these have their space and contribute to diversity. Diversity is an important factor in the struggle for survival everywhere in nature.

Our conference program is characterized by great diversity, addressing various aspects of beekeeping. For most beekeepers, the decisive criteria are threefold: good achievement, health, and easy handling of the bees. But the bright future of our unique bee with its peculiar characteristics can only be ensured if it is widely recognized and accepted. This recognition is the goal we are jointly aiming at.

But we also want to settle back in friendly conversation and exchange of ideas. For this purpose we have created a bee-bar for the evenings here in the centre, and tonight›s dinner will take a special form: we begin at 7.00 pm with an aperitif sponsored by the town of Landquart. Many thanks to our host town! During dinner we will be entertained by traditional music and songs, and maybe you will even want to bring your dancing shoes!

Our conference location, the Plantahof, is the only agricultural institution for education and consulting in the canton of Grisons. The Grisons are characterized by cultural diversity and three different languages: German, Romansh and Italian. So the Plantahof serves as a melting pot for the young people coming from diverse regions to study here often for several years. They form friendships which later become an important basis for keeping together such a complex structure as the canton of Grisons.

Thanks to its good infrastructure, the Plantahof regularly hosts conferences and meetings, such as the basic and continuing education of Swiss beekeepers. The on-site Mellifera apiary, which we plan to visit, plays an important role in this training. With our Sicamm conference, the Plantahof is now establishing itself also as an international conference centre. We thank for the friendly reception.

One person alone cannot shoulder the organization of such an occasion. It takes the engagement of a whole team and lots of money, especially for the simultaneous translation. This would not have been possible without our generous sponsors.

The lion›s share is taken by public authorities: The Federal Office for Agriculture, the Federal Office for the Environment and the Canton of Grisons. A large contribution comes from the Paul Schiller foundation, and we also thank for the contributions of many other supporters. The high sponsorship of government agencies is proof that our efforts and our engagement for an endangered bee species are appreciated. We are making a substantial contribution to the fulfillment of the UN Biodiversity Convention.

Many thanks to all the sponsors and to the organizing committee!

Let me end by quoting two great poets.
Goethe said, in free translation:
Knowledge alone is not helpful
It must be put to use.
Wanting alone is not helpful
It must be brought into action.

And you all know the famous line by Shakespeare, slightly simplified:
Bee or not bee

For us, that is not a question.

Thank you.

Hans-Ulrich Thomas, Zurich, Switzerland **thomas@mellifera.ch**
Saturday, 1st September 2012 10.00

Beekeeping in Switzerland

Beekeeping in Switzerland has a long tradition. The country is situated right in the middle of Europe and it was probably the Romans who spread the first knowledge about active beekeeping, rather than simple honey hunting. Today about 18,000 beekeepers tend 160,000 hives which translate into 4 hives for each km2, mountains and lakes included.

In 2011 the Swiss Beekeeping Association (VDRB -Verein deutschschweizerischer und rätoromanischer Bienenfreunde) celebrated its 150th anniversary. Established 1861, it is the oldest and with 14,000 members, the most important of the 3 language based associations. The French speaking association (SAR -Société dPApiculture Romande) has 2,500 members, and was established in 1876, and the Italian speaking society (STA - Società Ticinese) has 500 members, and was established in 1912. Beekeeping in Switzerland is an occupation for hobbyists as truly commercial beekeeping is virtually nonexistent.

This fact, the lack of large scale commercial interests, probably explains why bees were not listed in Swiss agricultural laws. This situation changed in 2007 when a parliamentary initiative launched by MP Brigitte Gadient was accepted and the law adapted accordingly. In addition, financial support for beekeeping was also markedly increased.

As a consequence the three societies have been united since 2010 under the new name of apisuisse which will develop into a service organisation for queen breeding, bee health, education and honey marketing. By law, is used solely to support specific activities by apisuisse, hence the specific activities quoted above.

What about honey?

Swiss honey has a high price and since 2006 its high quality standard is guaranteed by a special quality programme of apisuisse. To qualify under this regulation honey has to be produced by good apiculture practice and is sold with a special seal of excellence, the «Gold-Seal». This label assures quality levels beyond normal food law and it even includes an inspection of the apiary itself as well as a look at the honey frames on a regular four year cycle!

Increasing interest

Beekeeping in Switzerland picked up at the end of the 19th century when internal structures were organized and made available through the society. These included beekeeping courses, a monthly journal, and formal help and support for beekeepers such as an insurance service for bee losses.

The first basic textbook about keeping bees was published in 1889 by Ulrich Kramer and titled: “Der Schweizerische Bienenvater” (The Swiss Bee Father). This work has been periodically updated over the years and the 19th edition will appear in 2011.

Swiss beekeepers always had good international contacts and communicated their knowledge and experience through articles and numerous books. A recent count listed 245 Swiss authors that have written at least one book related to beekeeping!

There is one thing that has never changed over the years, especially in the German speaking part of the country and that is hive design. It is a long-standing tradition in Switzerland to keep bees in beehouses. Therefore, the «Swiss Hive» evolved for use in these circumstances. It is a wooden box with a fixed size and the following internal dimensions: 30cm width, 76cm height and 58cm depth. The lower half is the brood area which can hold a maximum of 15 brood frames plus a window. The upper half of the box holds a maximum of 22 honey frames placed in two layers and spaced 45mm apart. The size of the wax foundation for the brood frames is 335mm x 265mm which is slightly larger than A4 paper size; half of this (155mm x 265mm) for the honey frames. Hive inspection is done from the rear and queen excluders are not used. Due to their size and construction, the hives can be stacked on top of each other, making a perfect use of the available space in a beehouse.

Queen (race) breeding

Switzerland is the natural home of the Dark Bee (Apis mellifera mellifera), and in the early days of the 20th century queen bees were exported all over Europe. Unfortunately this activity disappeared over the years and today only a small fraction of beekeepers are queen breeders. This might be partly due to the fact that it is very easy to buy queens from abroad, together with the conviction of many beekeepers that “the grass is greener across the fence”.

This belief has no basis. With breeding and selection all bee races can be bred for gentleness, honey yield, disease resistance ... but somebody has to do the work!
Today apisuisse is in charge of queen breeding and supports breeding activities for the native Mellifera and Ligustica races. The Carnica and Buckfast races are also supported. In order to receive funding the breeding has to be done on a scientific basis. This necessitates isolated mating yards, DNA analysis, breeding records and evaluation yards for the blind testing of queens. The results are mathematically analysed by the “BLUP-method” for queen breeding and then added to the databank at www.beebreed.eu.

Results are readily available to the public. So far only the “mellifera.ch”, the Dark Bee Society ,is actively participating in this programme. There is good progress in breeding pure Mellifera bees that meet the demand for well performing bees. In 2012 an international congress will be held in Switzerland with the motto:
“For a bright future with the Dark Bee”.

Surprises and problems

Public interest in beekeeping has increased markedly in the last few years. Beekeeping classes are booked out quickly with no great promotional efforts needed by the local societies. A pleasant change is that 30% to 60% of the participants are now women. The picture of an elderly, pipe smoking man occupying himself in the apiary has to be replaced! The problem is not finding new beekeepers, it is finding people to take over responsibility on the boards of beekeeping societies.

Another worry is conflict of interest with nature conservancy laws or groups. As well as the controversial opinions about the influence of honeybees on the population of the numerous solitary bees and bumblebees in our environment. Experts agree that intensive agriculture, pesticides, loss of natural breeding places and the disappearance of untouched flower meadows are the main causes for bee losses. There are 11 published international research papers on this subject. One had no clear results, 5 found an influence and 5 did not. Bureaucratic humbug such as the pointless order to move a 60 year old beehouse 2.5m to meet a minimum boundary distance does not help in winning beekeepers to the cause of nature conservancy.

Swiss Bee Research Centre, Liebefeld, Bern

The institute was set up in 1904 in an attempt by the Government to find the cause of the huge colony losses suffered by beekeepers at that time. One year later Prof. Robert Burri, its first director, was able to report success. It was not foulbrood as expected, but a different bacterial disease which he named sourbrood (European foulbrood) the new findings, the disease could not get eradicated but was under control for almost 100 years with the exception of severe outbreaks in the 1960Ps when beekeepers experimented with applying antibiotics. In 1999, out of the blue, the disease developed with annually increasing outbreaks. Even today this disease is poorly understood and no easy cure exists. Artificial swarms with a 4 day hunger period will sometimes cure a hive, but generally, hives with a visible outbreak of the disease have to be killed off The Swiss Bee Research Centre (SBRC) is the national centre of research and competence in apiculture. Internationally SBRC made a name for itself with the development of a method for reliable population estimation as well as in setting and coordinating international standards for honey and pollen analysis.

A big challenge came with the arrival of Varroa leading to the development of the “alternative methods” of Varroa treatment with the combination of formic acid or thymol and oxalic acid which anticipated the predicted resistance problems with acaricides. Together with some European research partners this method was improved and is an established standard today. For the long term a safer and easier method of Varroa control is needed. Research is going on with new approaches influencing scent orientation, disturbing reproduction of the mite or using parasitic fungi for control. In the 2004 SBRC expanded its activity markedly. Funding from the Swiss Government, private sources and grants awarded for European research projects made this possible. Today about 25 international scientists work constantly on projects like:

- The possible influence of genetically manipulated plants on honeybees.
- The influence of new insecticides (Neonicotinoids) on honeybees and other pollinators.
- Research on foulbrood and sourbrood diseases.
- New parasites of honeybees, i.e. tropilaelaps mites, small hive beetle.
- Method for early detection of sourbrood with the help of a PCR-test (DNA detection).
- Determination of race or hybridization between carnica and mellifera bees.
- Diagnostic radioentomology using a tomograph. This technique allows a look into a beehive with out opening it.
- Microtomography. This instrument allows the dissection of a bee with a computer mouse rather than with a scalpel and a microscope.
- Host pathogen interaction with focus on the triangle bee-varroa-virus and the evolution of such Interactions.

In 2003, Switzerland like many other parts of the world, started to experience massive losses of honeybees. This phenomenon became known as CCD (Colony Collapse Disorder). In 2008 SBRC seized the initiative and started to organize the global network COLOSS (Prevention of Colony Losses). COST (European Cooperation in Science and Technology) made this programme possible. The aim is to coordinate and standardize monitoring and research relating to this phenomenon internationally. About 250 researchers from more than 50 countries are participating in this project. The guidance and coordination work for this project is done by SBRC.

Alexandar Uzunov, Faculty for Agriculture Science and Food, Skopie, Macedonia **uzunov@zf.ukim.edu.mk**
Saturday, 1st September 2012 11.00

Observations on queen mating behaviour on a small island

Ralph Büchler1), Aleksandar Uzunov2), Hrisula Kiprijnovska2), Sreten Andonov2)

The mating of honey bees depends on open flights, usually over several kilometres of distances. With regard to control the selection of mating partners, we wanted to study the effect of an extremely limited flight range of a small island on the mating behaviour of queens. The experiment was performed in June 2011 on a Macedonian island in Prespa lake. It has a surface of 21.9 ha and a minimum distance to the mainland of 2.1 km. There is no permanent honey bee population on the island, but we established five colonies with an estimated population of about 10000 adult drones one week before starting the experiment. We studied the behaviour of 34 queens during their natural mating period (day 6-11 after emergence) using mating boxes with transparent front extensions and queen excluders to observe the time and duration of all flights and the presence of mating signs on return. All flights of queens happened between 12.35 and 15.33 h CEST. Nine queens (26.5%) were lost during their flights. From the 25 surviving queens, one did not perform any flight. The average number of flights per queen was 10.8, spread over 3.2 days, with a maximum of 28 flights for one queen which returned four times with a mating sign. We observed a maximum of ten daily flights per queen. 21 queens (61.8%) returned at least once with a mating sign and on average 2.2 successful mating flights per queen were observed. The flight duration of queens was on average 4 min 55 sec with a gradual increase from the first (2 min 49 sec) to fifth flight (6 min 36 sec). The longest flight duration of a queen returning without mating sign was 23 min, while the shortest and longest flights of queens returning with mating sign were 2 and 38 min respectively. The unusually high flight frequency of the queens indicates a disturbance of the mating behaviour under the specific test conditions although successful matings obviously did happen within the range of the small island. However, some of the successful mating flights lasted long enough to enable those queens.

Ralf Büchler, Bee Research Institut Kirchhain, Germany **ralph.buechler@llh.hessen.de**
Saturday, 1st September 2012 11.30

Effects of genotype and environmental factors on the survival and productivity of Eurpean honey bee colonies

Ralph Büchler*1), Stefan Berg2); Malgorzata Bienkowska3), Beata Panasiuk3), Yves Le Conte4), Cecilia Costa5), Winfried Dyrba6), Maria Bouga7), Fani Hatjina8), Leonidas Charistos8), Plamen Petrov 9), Evgeniya Ivanova 10), Nikola Kezic11), Seppo Korpela12), Per Kryger13), Hermann Pechhacker14), Aleksandar Uzunov15), Jerzy Wilde16)

In order to better understand the role of bee genetics for the Europe-wide occurrence of colony losses an experiment on genotype – environment interactions (GEI) was started by COLOSS working group 4 in July 2009. A number of 621 honey bee colonies, representing 18 different genotypes, are comparatively tested in 16 apiaries across Europe. The colonies are kept without any chemical treatments against Varroa destructor and other diseases. Colony and queen survival are registered continuously, besides bee population development, productivity, feed balance, swarming, gentleness, hygienic behavior and the infestation levels of Varroa, Nosema and viruses. The tested genotypes clearly differ in their honey productivity, gentleness and swarming tendency which can at least partially be explained as a consequence of different breeding intensity for these classical selection characters. However, it is important to note that highly significant genotype – environment interactions can be observed when these characters are taken into account. To sum up our primary results, we can state a high relevance of interactions between honeybee genotypes and different environmental conditions within Europe. Obviously, the genetic adaption of honeybees to a specific environment influences its population dynamics, health status, and productivity. Consequently, the conservation of European honey bee diversity and the support of local breeding activities should be encouraged.

(Publications: Journal of apicultural research 2013)

Kaspar Bienefeld, Institute for Bee Research, Friedrich Engels Str. 32, 16540 Hohen Neuendorf, Germany
Saturday, 1st September 2012 14.00 **kaspar.bienefeld@rz.hu-berlin.de**

Considering several traits simultaneously in the honey bee - Total breeding value improves selection

The combination of performance testing and genetic evaluation provides insight into the breeding value of an animal. This breeding value states, for a particular characteristic (e.g. for the honey bee, kg of honey, less varroa, etc.), how much an animal is genetically better or worse than the average of the population. In 1994 the most recent genetic evaluation system (BLUP Animal Model) was adjusted for the peculiarities of the honey bee at the Institute for Bee Research in Hohen Neuendorf, Germany (www.beebreed.eu). This approach uses genetic relationships between all colonies within the population. In addition, because traits of colonies are affected by the genetics of the queen and the worker bees, both generations (mother and daughters) were taken into account (Bienefeld et al. 2007, Apidologie 38: 77-85). Since the beginning of genetic evaluation, genetic

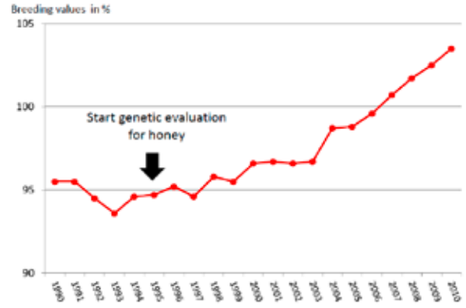


Fig. 1: Genetic response for honey production since starting genetic evaluation

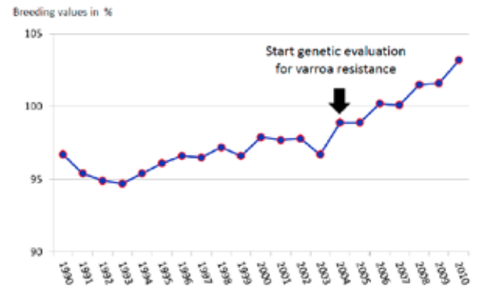


Fig. 2: Genetic response for Varroa tolerance since starting genetic evaluation

response significantly increased (Fig. 1 & Fig. 2). However, in recent years, more and more focus has been put on improving several traits simultaneously. A way to increase the accuracy of predicted breeding values for all traits in the breeding goal is to use multivariate methods for prediction of breeding values in order to fully exploit the data and to combine direct and indirect information on correlated traits in the breeding goal. In a "Total Breeding Value", all of the individual values corresponding to their breeding and economic significance are combined in one number. In so doing, the heritability of all of the individual characteristics, the genetic relationships between them, and the relative significance (weighting) of the individual characteristics for the breeder must be considered. Genetic parameters were estimated; however, the relative significance of the selection traits for the individual breeder is of course not known to us. On the basis of the great significance of Varroa tolerance, and of its very high importance nowadays relative to honey yield and gentleness, we recommend that the weighting for Varroa tolerance in the Total Breeding Value be set high (40%). Using this standard Total Breeding Value (see www.beebreed.eu) a significant genetic response toward Varroa tolerance can be expected. However, the databank offers the possibility of choosing a completely personal weighting of preferences for the set of selection criteria (Fig. 3 & Fig. 4). The Total Breeding Value is a milestone in honey breeding. It supports the selection of colonies by honey bee breeders in order to meet their specific demands, and enhances the development of a healthy and efficient honey bee population.

Fig. 3: On-line breeding planning: Search for the best mating station for an individual queen, considering the specific selection goal of the breeder

Fig. 4: On-line breeding planning: List of mating stations at which a individual queen should be mated to meet the specific selection goal of the breeder

Acknowledgements
Thanks to Klaus Ehrhardt and Marion Schröder for their support. These projects received support from the Departments of Agriculture of Brandenburg, Saxony, Saxony-Anhalt, Thuringia, the Senator of Economics and Technology in Berlin, the Federal Ministry of Agriculture and the German Beekeeping Association.

Thomas Petermann, Society for the dark bees, Germany **petermann@mnet-online.de**
Saturday, 1st September 2012 14.30

The society for the dark bees, Germany

The consortium consists of several autonomous groups. As an umbrella organisation we serve beekeepers as a contact point to get them in touch, say, queen breeders. The form of a consortium was choosen because of its flexibility. This way we can welcome ambitous queen breeders as well as beginners. Our bylaws simply state our aim and define the structure. History The first regional group was founded in Melchow near Berlin by several beekeepers who got to know each other via an Internet forum. Several more regional groups were founded later on and today the consortium consists of seven groups with a membership of 300, trend upwards. Via our own forum we keep in touch and discuss topics around queen breeding and beekeeping in general. Aims and results Our most important aim is to build our own population of the Apis mellifera mellifera in Germany and to provide bee colonies and queens to German Beekeepers. To accomplish this we will build up a systematic breeding program in Germany with the disposal of all native species in Europe. We will work with artificial insemination stations (3 at present) and operate isolated mating yards. A mountain mating yard in the alps may open this year, 2 more are in planning state. Other objectives are: – Increased networking with Organisations and Beekeepers in Germany and Europe – Education of beginning beekeepers and breeders – Public Relations and promotions Especially, we try to expand our connections to the "Deutscher Imkerbund" (German Beekeeping Foundation) who has invited our association to its frequent conferences. We want to thank all German, and especially all European Beekeepers and Breeders who helped us to bring back our domestic Dark Bee to Germany.

Gabriele Soland, mellifera.ch, Swiss Black Bee organization; **soland@mellifera.ch**
Saturday, 1st September 2012 15.00

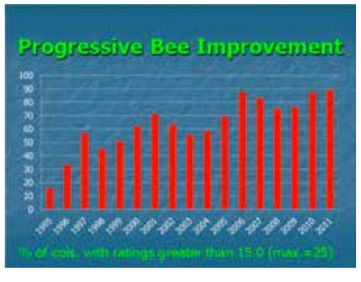
Genetic Diversitiy and Hybridisation of the Honeybee

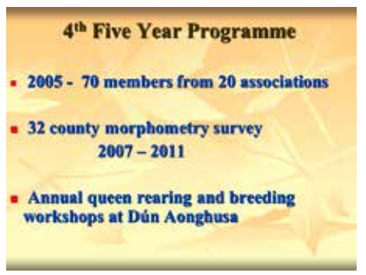
The mating system of the honeybee shows some speciality that makes breeding a true challenge. Especially the control of the mating partners for the high quality queens is a tedious task. When it comes to more than breeding for better quality, that is, if the maintenance of a whole subspecies is at stake, the mating behaviour of the honey bee can become a true threat to its own maintenance. In western and central Europe, the indigenous subspecies Apis mellifera mellifera is nowadays threatened not only by replacement but also by hybridisation. We show the effect of hybridisation on the breeding population prior to the implementation of the genetic hybrid analysis and its effect on the purity status of the breeding population. Furthermore we introduce its use for the installation and management of a conservation area of the black bee.

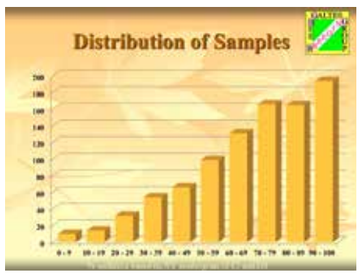
Das Paarungssystem der Honigbiene weist einige Spezialitäten auf, die ihre Zucht zur wahren Herausforderung machen. Besonders die Kontrolle der Paarungspartner der qualitative hochstehenden Zuchtköniginnen ist ein mühsames Unterfangen. Wenn die Bemühungen weiter reichen als reine Zucht von Eigenschaften, wenn es nämlich auf die Erhaltung einer ganzen Unterart kommt, wird das eigene Paarungsverhalten der Honigbiene zu einer Bedrohung. In West- und Zentraleuropa ist die einheimische Unterart, die Apis mellifera mellifera, heute durch Verdrängung und Vermischung bedroht. Wir zeigen die Auswirkungen der Vermischung auf die Zuchtpopulation vor der Einführung des genetischen Hybridtests und seine Wirkung auf den Reinheitsgrad der Population. Weiter zeigen wir die Anwendung des Tests bei der Einrichtung und dem Management von Schutzgebieten.

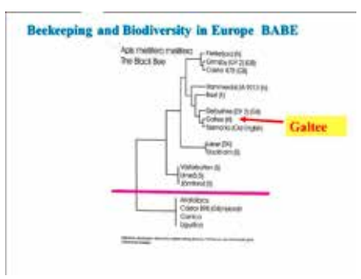
Micheàl Mac Giolla Coda, Galtee Beebreeding Group, Ireland **galteehoneyfarm@hotmail.com**
Saturday, 1st September 2012 16.00

Two decades of Progress for the Dark European Honey-bee (Apis mellifera mellifera) of Ireland









Lauri Ruottinen, MTT agrifood Research, Finland **lauri.ruottinen@mtt.fi**
Saturday, 1st September 2012 12.00

Conservation of the Nordic Brown Bee

Lauri Ruottinen, Agrifood Research Finland is Finland, FIN-31600 Jokioinen NordGen – the Nordic Genetic Resource Center – is a Nordic organization dedicated to the safeguarding and sustainable use of plants, farm animals and forests. NordGen will start an intensive project to clarify the current status of the Apis mellifera mellifera in the Nordic and Baltic countries. Also, the current in situ and ex situ conservation of A. m. mellifera and suggestions for future research activities in Nordic countries will be published. The work will be carried out between May and December 2012. The responsible organization of this work is MTT Agrifood Research Finland. Preliminary results of the work will be presented.

Florian Sutter, mellifera.ch, Swiss Dark Bee Association **florian@sutter-adler.ch**
Saturday, 1st September 2012 16.30

The role of Instrumental Insemanation for the conserevation of the Dark Bee: Potential and Pitfalls

Florian KP Sutter, Head Mellifera Breeding Group and Mating Station «Säntis», Ebnetstrasse 12, 9100 Herisau, Switzerland Instrumental Insemination has been established as a tool for scientific studies and breeding of honey bee queens. In many areas of hybridisation instrumental insemination is the only option for breeding programs of the Dark Bee. While the technology is easily available and the procedure of the insemination itself can be learnt by most people, many challenges remain. The selection and care of the drone colonies, exclusion of foreign drones, harvesting and storage of the semen, maintaining of sterile working area and the care of the queen before and after the insemination are at least as complex as running a natural mating station. Therefore a dedicated and well organised team is needed to enable instrumental insemination quality and safety. The potential and pitfalls of instrumental insemination in the context of a breeding program for the European Dark Bee are presented.

Conference diner with entertainment
Saturday, 1st September 2012 19.00

Sorry for the Break: Dinner is ready

Balser Fried presents the local Yodel choir

We will continue tomorrow morning ➔

Kaspar Bienefeld, Institute for Bee Research, Friedrich Engels Str. 32, 16540 Hohen Neuendorf, Germany
kaspar.bienefeld@rz.hu-berlin.de
Sunday, 2nd September 2012 09.00

A new strategy for honeybee breeding - Genomic selection

In order to identify the genes involved in honey bees' Varroa tolerance, a honey bee SNP (single nucleotide polymorphism) chip with 44 000 genetic markers was developed at the Institute for Bee Research Hohen Neuendorf (Spötter et al., 2012, Mol. Gen. Resources: 12: 323-332). Altogether 22 000 individually labeled workers were observed by infared video with respect to their response towards Varroa-infested brood cells (Fig. 1)

122 highly hygienic worker bees and 122 non-hygienic sisters were genetically analyzed with the help of the SNP chip. 4 genetic markers showed a significant genome-wide association with the uncapping behavior towards Varroa infestedcells. Inspection of the genomic region around these markers led to the discovery of putative candidate genes, which are currently the subject of mutation analysis. In addition to the detection of candidate genes for traits of interest, this technique can also be used for genetic evaluation (Meuwissen et al. 2001, Genetics 157:1819-1829). This approach, called genomic selection, is the selection of animals based on genetic markers. When the marker effects are known, and when it is known which markers the animal carries, the breeding value of the animal based on these markers can be calculated much more precisely. Using the data of genetic evaluation and the new SNP chip, we are currently planning the application of Genomic Selection in the honeybee. The application of this molecular genetic method will enable us to:

- Increase the accuracy of genetic evaluation
- precisely estimate the genetic relationships between colonies
- simultaneously check for paternity and race
- calculate the real genetic variability within a population and consequently make it easier to preserve it
- provide the chance to evaluate genes for resistance against uncommon diseases (e.g. American Foulbrood).

Acknowledgements
Thanks to Andreas Spötter, Ivonne Kretschmer, Pooja Gupta for their support. These projects received support from German Federal Ministry of Agriculture.

Fig. 1: Infrared video technique doesn't disturb honeybees during the 7 days observation period

Philip Denwood (British BKA and BIBBA) **p.denwood@yahoo.co.uk**
Sunday, 2nd September 2012 9.30

Dark Bee Apis mellifera mellifera in the United Kingdom

Recent articles by Dr. Dorian Pritchard, and by Norman Carreck of the Laboratory of Social Insects at Sussex, have presented the evidence, convincing in my opinion, for the immigration of the honeybee into mainland Britain across the land bridge from Europe at least 9000 years ago, and its continued existence here ever since. This bee would have been the ancestor of the Apis melifera mellifera or dark european subspecies and geographical race, as would any later imports from neighbouring parts of the continent by man. Subsequent natural selection down to the mid 19th century produced a variety of local strains of this bee adapted to the various environments of the country.

The period from 1859 to the present day has seen the importation of bees of both A.m.m. and other subspecies from many parts of Europe, including the Netherlands, France, Italy, the Balkans and Cyprus, and further afield from as far away as New Zealand. It has also seen the creation and importation of a number of hybrid-based bee types collectively known as Buckfast, under the initial inspiration of Brother Adam

The above views, at least as they concern early history, are at odds with those published by others and adopted by the official body promoting nature conservation south of the border, Natural England, whose staff maintain that the honey bee was introduced by man some 1500 years ago, is therefore not "native" to Britiain, and should therefore be excluded from nature reserves. Another and more serious case of flying in the face of the evidence is that of the "Isle of Wight Disease", an event which is commonly alleged a) to have caused the heavy losses of bee colonies which occurred between 1906 and 1918; b) to have been caused by the acarine or tracheal mite; and c) to have exterminated the native British honeybee during that time, prompting the importation under the government's restocking scheme of large numbers of bee colonies, mainly from the Netherlands and France.

Many experienced beekeepers in the 1920s and later, for example in the pages of the British Bee Journal, challenged the views that IOW disease was caused by acarine and that it caused extinction of any race of bees. L.E.Snelgrove commented in 1946, " … many writers have expressed the view chat bees of pure British origin cannot now be found. The writer does not hold this view. Apart from the fact that he has continuously found British bees in certain country districts showing no sign of crossing with foreign races, the laws of heredity conflict with the supposition that a pure race can be eliminated by crossing alone. In 1936 sanctions were imposed on Italy by the British Government and the importation of queens from that country diminished from that time and ceased during the war. For some years, too, the importation of other races, Carniolans, Caucasians, etc., has been discontinued. The Italian element, as shown by colouring, is steadily disappearing and many of our bees are becoming dark and indistinguishable from the old British bees." (See below.)

The Isle of Wight phenomenon was thoroughly debunked on a scientific basis by Dr.Leslie Bailey of Rothamsted in 1981. According to Beowulf Cooper, founder of BIBBA, "Some of those personally involved in the restocking campaign have admitted to me that there was in fact no shortage of surviving native bees." And yet as Norman Carreck has recently written, "half a century after the explanation was found to be scientifically unsound, many beekeeping books and articles still perpetuate the myth the the IOW disease was caused by the tracheal mite Acarapis woodi"; a prominent example being H.R.C.Riches, President of the Central Association of Beekeepers and past President of the British Beekeepers Association in 1992. Even today similar claims are commonly made. However, in the last decade DNA studies by Pedersen and others in Denmark and elsewhere have conclusively shown that modern specimens of Dark Bees from the UK and Ireland fit into the genetic specification of Apis mellifera melifera (see e.g. the article by Pritchard).

Characterisitics of British A.m.m.
Physical characters Cooper, 1986

1. Bees «black».
2. Long abdominal overhairs.
3. Characteristic wing type.
4. Genetically large size.

Behavioural characters
I will now discuss some of the behavioural characteristics of the British A.m.m. as listed by five authorities:

A. A correspondent identified only by the initials JFH, British Bee Journal, 1925

1. Less prolific
2. Begin working early in spring
3. Begin breeding early in spring
4. Excellent comb builders
5. Easy to handle
6. Not inveterate swarmers

B. Snelgrove, 1946

1. Hardy
2. Winter well
3. Work early & late in the day
4. Moderate swarmers
5. White cappings
6. Little propolis
7. Resistant to disease
8. Quiet on combs
9. Not unduly aggressive
10. Slow to develop in early spring
11. Small brood nest
12. Settle down early for winter
13. Consume little in winter

C. Brother Adam, 1966

1. Less prolific.
2. Long lived.
3. Long flight range.
4. Thrifty.
5. Incomparable cappings.
6. Speed of comb building.
7. Extreme susceptibility to acarine

D. Cooper 1986.9

a) Flight pattern characters.
5. Low temperature flight.
6. Non-collection of dew at dawn.
7. Reluctance to fly when snow lying.

b) Colony population characters.
8. Longevity.
9. Non-prolificacy.

c) Characters adaptive to season and locality.
10. Heavy spring to summer pollen storage.
11. Heavy late summer pollen storage.
12. Early cessation of brood rearing in late summer.
13. Thriftiness.
14. Adaptation to local flora.
15. Tight winter clustering near hive entrance.

d) Nest characters.
16. Comb honey cappings white and convex.
17. Compact brood pattern.
18. Compact honey storage pattern.
19. Fluctuating broodnest temperature.

e) Characters affecting mating and interbreeding.
20. Minimal drifting.
21. Drones expelled earlier.
22. Alternative mating behaviour.
23. Temperament compatible with other native bees.

F. Ruttner, Milner & Dews 1990.10
1. Late start in spring
2. Early cessation for winter
3. Excellent wintering
4. Non-flying with snow on the ground.
5. White cappings.

The following characters are common to two or more of the above sources:

1. Unprolific.
2. White cappings.
3. Thrifty.
4. Compact brood nest.
5. Alternative mating behaviour.
6. Early cessation for winter.
7. Good wintering on little stores.

On the other hand, there is disagreement on the following characters:

1. Early/late start to brood raising. The answer to this may be the Dark Bee's ability to attune its development to the progress of the season.

2. Disease susceptibility. Brother Adam insists that the Dark British Isles Bee was comparatively extremely susceptible to acarine disease. This was refuted by Bailey, and again more recently by the collaborative European "Bee Shop" research project: "Those that claim non-native stock has lower disease susceptibility are wrong. The onus is on them to demonstrate scientifically their claims." (Sweet)11

3. Quiet/restless on combs. This presumably relates to different strains within the Dark Bee race.

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Sunday, 2nd September 2012 11.00 **qm.ruppel@gmail.com**

Zucht der Dunklen Biene in Deutschland und Details zu den «Mondschein Belegstellen»

Mit Beginn der «modernen Bienenzucht» um ca. 1850 verdüsterte sich die Situation der Einheimischen Dunklen Bienenpopulationen mit dem ersten Zyklus der Hybridisierung und Niedergang der Imkerei bis nach dem ersten Weltkrieg. Ursächlich war offensichtlich die Einfuhr der Italiener- und Ägyptischen Bienen zur Ertragssteigerung.

Wenn man alte Literatur aus dieser Zeit liest, erfährt man etwas über die Leistungsbilanz der Imkerei vor der Katastrophe und danach: Die autochthonen Bienen lieferten bis dahin Wachs um Amtsstuben, Kirchen und die Oberschicht mit Licht zu versorgen. Vor Einführung des Bieres löschten sie den Durst mit Met und der Honig deckte den Bedarf vor dem Zucker auf Süßes.

Der durchschnittliche Honigertrag wurde angegeben mit 25 Pfund Ernte, 25 Pfund belassenes Winterfutter und 25 Pfund Startkapital für einen Ableger. Spitzenerträge aus der Heide mit 70 kg sind auch belegt. Die Zahlen decken sich mit Angaben aus heutiger Zeidlerei mit der Dunklen im Südural. Nach zwei/drei weiteren Zyklen der Hybridisierung und Inzucht, von 1900 bis ca. 1960, die «Zucht der Deutschen Nigra», von 1945 bis heute «Deutsche Carnica» begleitet von der Buckfast, erfuhren wir analog Schübe von Parasitierung, Krankheiten und invasiven Schädlingen (es gibt noch genug davon in der globalisierten Bienenzucht). War es früher die Tracheenmilbe, ist es heute die Varroa und morgen usw., usf. Nach ausräumen und vergiften der Landschaft mit Auswirkungen in der Biodiversität und Stellenwert in der Volkswirtschaft, allein gemessen am heutigen Verbrauch einheimischen Honigs, ist die Leistungsbilanz der «modernen Bienenzucht» eher lau, abgesehen von den Erfolgen in der «Leistungs-, Resistenz- und Vitalitätszucht».

Nach dem Ende der «Wahlzucht», mit Beginn der «Schiefen Ebene», begannen einige Wenige, außerhalb der Meinungsführerschaft, sich Gedanken über den Erhalt der reinen Bienenrassen, als Grundlage der zukünftigen Bienenzucht zu machen. Nach dem Konferenzmotto sind wir ja schon lange und bei weitem über den Berg, mit sehnsüchtigem Blick nach oben und besser nicht zurück. Es war der Pfarrer Herr Köhler, der vorausschauend einiges befürchtete und das «Köhler›sche Verfahren» erfand.

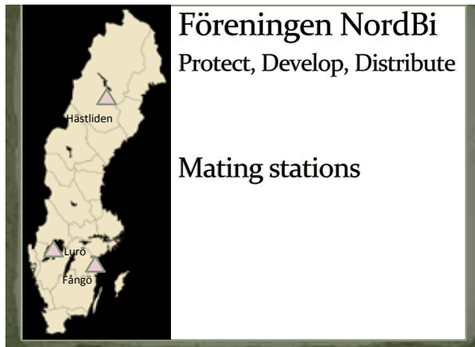
Sein Prinzip, welches bis heute und in der allgemeinen Tierzucht seine Gültigkeit hat ist, ausgewähltes mütterliches und väterliches Erbgut kontrolliert, gesund und rein zum Rassenerhalt zusammenzuführen. Dass dies mit allen konventionellen Methoden der «modernen Bienenzucht» gegen die Biologie der Honigbienen nicht möglich ist, kann man leicht an deren Früchten erkennen. Herr Köhler erlitt mit seiner Idee Schiffbruch an den Machtverhältnissen, so verschwand diese in der Schublade der Geschichte «Deutsche Bienenzucht». M.W. wurden aus der Not (stechlustige Wilddrohnen) die Gedanken zuerst in Australien aus der Versenkung geholt und modifiziert. So wurden aus den EWK›s mit verdunkelten Fluglöchern und Kellerhaft des Herrn Köhler, Drohnenvölker und Begattungseinheiten, welche während der Tageshitze in Kühlräume geschoben und in den Abendstunden zu ihrer Bestimmung wieder herausgeholt wurden. Ebenfalls aus der Not, in einem mit invasivem Erbgut verseuchten Umfeld den Erhalt der Dunklen Bienen in Deutschland bewerkstelligen zu können, wurde die «Mondscheinbelegstelle» aus vorherigen Verfahren, nach den Trachtverhältnissen und anderen Gegebenheiten in Deutschland weiter entwickelt. Nach anfänglichen Experimenten ergaben sich weitere Schwerpunkte:

- Zur optimalen Versorgung der Geschlechtstiere, sollten die Arbeitsbienen den ganzen Tag über ihre Aufgaben erfüllen können.
- Die «Drohnenvölker» sollten eine entsprechende Stärke aufweisen, damit kleinere Einheiten auch davon profitieren und ständig verstärkt werden können.
- Die Wahl der Geschlechtstiere erfolgt nicht ausschließlich nach «dem Bien», sondern daraus nach dem Individuum.
- Damit der Begattungsflug auch während des normalen Standgeschehens erfolgen kann, wird der Zeitpunkt nach dem natürlichen Drohnenflug am Abend und mit Geruchsmarkierung durchgeführt.

Die «Mondscheinbelegstelle» hat sich schon bei der Rückzucht der nigra nigra aus reinen Apis m.m.nigra Herkünften bewährt und steht somit auch bei der Rückzucht von beschädigten Populationen, mit begleitender Nachprüfung entsprechenden Merkmals- und DNA-Untersuchungen zur Verfügung. Experimente außerhalb der Erhaltungszucht der reinen Dunklen-Ökotypen unterstützen wir nicht.

Ingvar Arvidsson, Project NordBi, Sweden **ingvar.a@nordbi.nu**
Sunday, 2nd September 2012 11.30

How to preserve and develop the native Black Bee in Sweden



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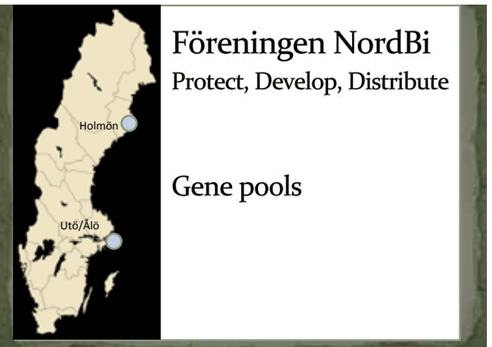
Protect, Develop, Distribute

Mating stations



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Gene pools

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The number one Priority:

Purity of Race
Measured by
Cubital index
Discoidal index

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An 80 % correlation has been considered sufficient.
Animals with less correlation are not actively chosen for breeding purposes

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This qualifies about 1.000 colonies
Unfortunately, less than 100 are used, due to practical reasons

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In a range from 1-5 we measure:

1. Swarming tendency
2. Temperament
3. Comb behavior
4. Yield
5. Chalk brood

Three times every season!

Föreningen NordBi
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More than 2.000 colonies are predominantly of mellifera mellifera origin.

Apis mellifera mellifera is part of thousands and thousands of mongrel colonies of no, or little, use to us.

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What else did we do?

1. Mainly relied on Mating Stations, but later
2. We shifted focus and started using Mating Areas as well

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Genetic Diversity is the most important tool when it comes to
Protection and Development

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Mating Stations and Inseminating are for purifying certain characteristics, only

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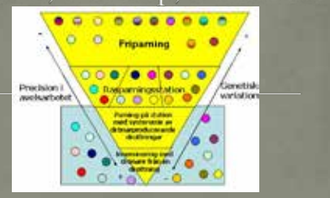

This is how it works!

Föreningen NordBi
Protect, Develop, Distribute

2011 we sent several Queens to other contries:

Germany: 31 queens
Lettland: 15 queens
Belgium: 5 queens
Tjeckia: 4 queens
Denmark: 2 queens
The Netherlands: 2 queens

And 150 ordered for 2012 so far

Föreningen NordBi
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Problems we face:

1. Too few pure AMM colonies
2. Too few AMM beekeepers
3. Too few pure freemating areas

Föreningen NordBi
Protect, Develop, Distribute

Things getting better:

1. More AMM colonies
2. More AMM beekeepers
3. More pure freemating areas

Vitådalen, Sundsvall, Svenstavik Ragunda

Föreningen NordBi
Protect, Develop, Distribute

Together, and with a little help,
We can do it!

Dorian J. Pritchard, BSc, Dip Gen, PhD **dorian.pritchard@btinternet.com**
Sunday, 2nd September 2012 12.00

Inbreeding Problems and their Avoidance

Introduction

At the 2009 conference in Aviemore we held a discussion with a view to identifying the currently most important problem in honey bee conservation. It turned out to be inbreeding and in summing up that discussion, I challenged the geneticists present to develop a strategy that could be understood and put into practice by the ordinary beekeeper, which would solve this problem. What follows is part of my own response to that challenge.

There are three major categories of problem caused by inbreeding in honeybees: recessive disease, inbreeding depression and reduced fertility related to the creation of diploid drones. Disease can be caused by recessive Mendelian alleles acting independently, which create a problem when homozygous (i.e. two copies of the same are present). Inbreeding depression is typically a polygenic condition, the opposite of hybrid vigour. The creation of diploid drones is perhaps unique to bees and by far the most important consequence of inbreeding of honey bees.

The origin of diploid drones

Bees have no X or Y chromosomes, instead a single genetic locus controls sex determination. Altogether there about 20 different sex determining alleles (versions of the same gene). Every female bee has two different alleles (i.e. is heterozygous), but only one is present in each ovum, as in drones and sperm.

When a queen mates with a related drone her ovum can get fertilized by a sperm with a copy of the same sex allele inherited from a common ancestor (i.e. is homozygous). The fertilised ovum then begins to develop abnormally, with two sets of chromosomes (i.e. is diploid), but of male sex. When a diploid drone larva emerges from the egg it is immediately killed and eaten by the house bees, resulting in a gap in the subsequent worker brood capping.

Number of sex alleles

The chance that homozygosity will arise at the sex locus depends on whether that queen is from the same social group as the drones and crucially, the number of different sex alleles in that population. The number of sex alleles it holds is in fact the ultimate limiting factor determining the viability of an isolated honey bee population (Kraus, 2005).

Important questions for the beekeeper are:

1. What is the minimum number of sex alleles necessary for colony survival?
2. How can we count the number of sex alleles in a breeding population?
3. How can we increase the number of sex alleles?

A theory for counting the number of sex alleles was put forward by Woyke (1976).

- If there are N sex alleles, their average frequency is 1/N.
- The Hardy-Weinberg Law then states that the average frequency of homozygotes is: $(1/N)^2$.
- The total frequency of homozygotes is: $N(1/N)^2 = 1/N$.
- Therefore the number of sex alleles, N = 1/(the frequency of diploid drones).

In calculating N we need also to consider that some worker brood cells are empty for other reasons. Woyke (1976) found that even in completely outbred stocks, 6% of brood cells remained uncapped. A refined method by which the number of sex alleles in the brood can be estimated is therefore as follows:

- Count the number (x) of vacant cells in a typical patch of 100 capped worker brood cells 12 days after the eggs were laid.
- Reduce this number by 6, i.e. x – 6.
- Divide the answer into 100 to give the number of sex alleles, N, i.e. N = 100/ (x – 6).

Example:

- A rhombus enclosing 100 cells has 44 empty cells,
- Corrected percentage: 44 – 6 = 38%.
- N = 100/38 = 2.6 sex alleles.

Brood viability and winter survival

Tarpy and Page (2002) found that honey bee colonies with >75% brood viability in summer all survived the following winter. Of colonies with <72% viability, only 37.5% survived the following winter. The brood viability in the previous example is 100 – 44 = 56%. Since this is well below 72%, the prognosis is that this colony would almost certainly not survive the winter.

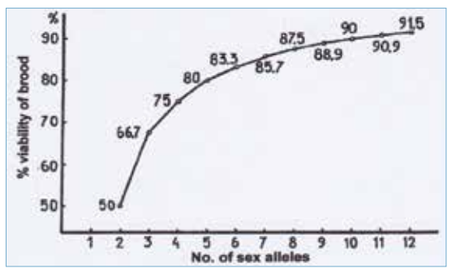

Fig.1. The relationship between brood viability and number of sex alleles (Woyke, 1976).

Fig. 1 shows the theoretical relationship between brood viability and the number of sex alleles (Woyke, 1976), but brood viability also depends on the age of the queen. Al-Lawati and Bienefeld (2009) investigated the viability of eggs laid by queens in their 1st, 2nd and 3rd years after transferring those eggs to an incubator (see Fig. 2). Woyke (1976) found a rather higher in vivo viability, but his observations were confined to queens in their first year. The two sets of data can be combined to estimate the likely in vivo viability of eggs from queens in their 2nd and 3rd years (see Fig. 2).

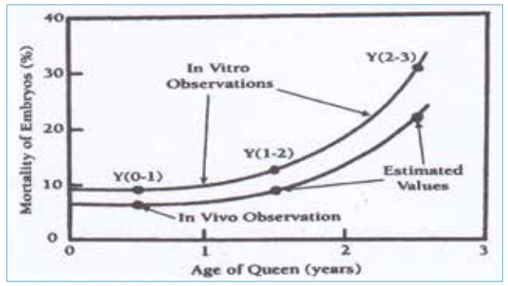

Fig. 2. Mortality of honey bee embryos in relation to age of the queen, in vitro and in vivo (Al-Lawati and Bienefeld, 2009; Woyke, 1976).

Combining these data we can plot the expected percentage of empty worker brood cells when the queen is in her 1st, 2nd and 3rd years, in relation to the number of sex alleles, as in Figure 3. This figure also shows the 75% threshold predictive of high probability of winter survival and the corresponding number of sex alleles when the queen is of different ages. It shows that if the queen is no older than 2 years (Y(0-1), Y(1-2)), most colonies should survive if the population contains at least 6 sex alleles. However, according to these data, if the queen is older than 2 years (Y(2-3)) her colony has only a low chance of survival no matter how many sex alleles are present. To ensure good brood viability (e.g. > 85%), it would be wise to try to maintain at least 11 sex alleles in the mating population.

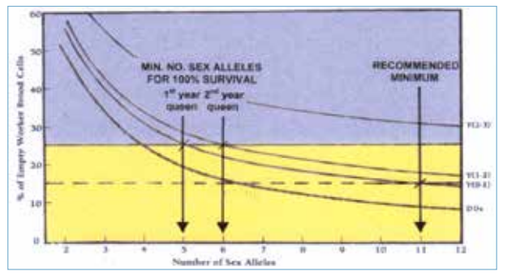

Fig. 3. Brood mortality in relation to the ages of queens and number of sex alleles.

Breeding strategies

A breeding strategy must be adopted that ensures survival of as many sex alleles as possible. One strategy that is NOT recommended is use of a single selected "breeder queen", as this rapidly leads to a seriously inbred situation (Fig. 4). An alternative is the "Multiple Queen Line" approach, designed to maintain the greatest genetic diversity (see Ruttner, (1988); Fig. 5). However, although a considerable improvement, experience shows care must still be taken to detect and eliminate adverse effects of inbreeding within each of the three queen lines (Bienefeld, K. personal communication).

Other calculations suggest the minimum number of hives necessary to maintain an isolated population is about 100, or 30 – 50, if extra drone foundation is provided (Pritchard, 2011, 2012).

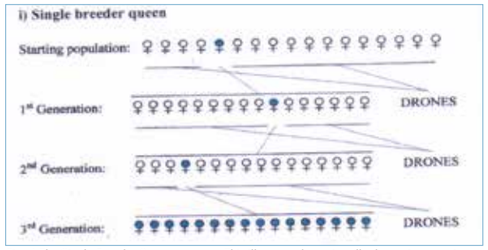

Fig. 4 The Single Breeder Queen strategy. This illustrates how virtually the entire genetic component of a generation can be derived from a single queen.

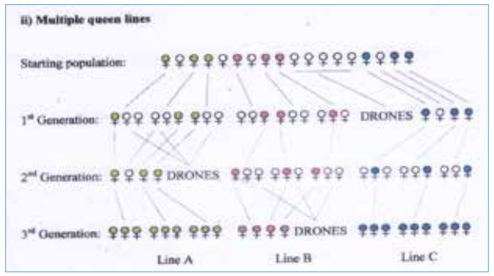

Fig. 5 The Multiple Queen Line strategy. This illustrates the use of separate queen lines with a programmed pattern of mating between them, showing maintenance of the maximum genetic diversity (Ruttner, 1988).

Conclusions

- Inbreeding creates 3 kinds of problems, of which the most important is reduced brood viability due to creation of diploid drones.
- The frequency of diploid drones depends on the number of sex alleles in the population.
- The brood viability danger level for winter survival is 75% , which is equivalent to 5–6 sex alleles with queens in their 1st and 2nd years.
- It is recommended that beekeepers aim for >85% brood viability, which in a healthy colony can be conferred by 11 sex alleles.
- Breeding strategies should aim to maintain several genetically distinct queen lines.

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Sunday, 2nd September 2012 14.00

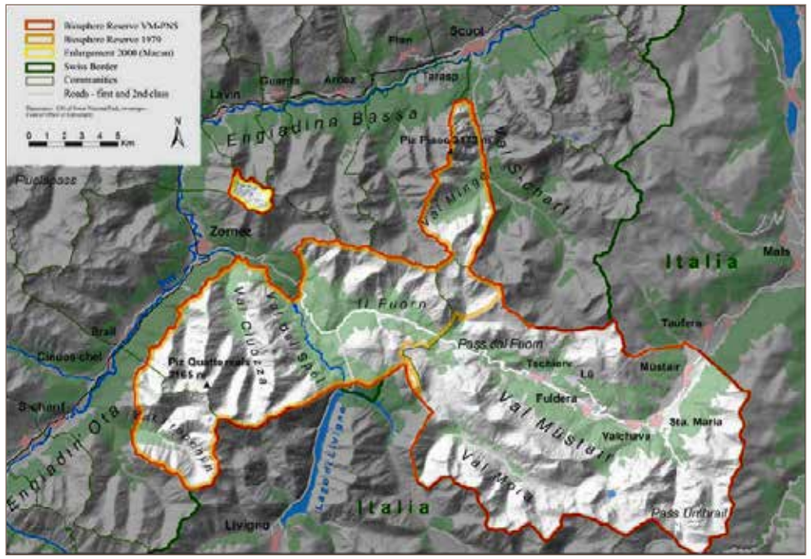
Mellifera Conservation Project Val Müstair

In Switzerland we have about 130'000 bee colonies of which 1/3 are of Mellifera type, whereas approximately 10'000 colonies of pure breed. The rest are hybrids or near native bees. Originally the dark bee Apis mellifera mellifera, Amm, populated Switzerland north of the Alps. Particularly since Second World War the population regressed due to imports, mainly of Carnolian and lately Buckfast bees. In the early nineties concerned bee keepers about this threatening development founded the Swiss Mellifera Bee Friends Association, VSMB, with the aim to protect, develop and conserve this unique native bee. The strategy to it is based on two pillars: (1) Line breeding and (2) establishing of conservation regions.

The line breeding is based on the BLUP (Best linear unbiased prediction) concept, implemented in the Beebreed software program (www.beebreed.eu). Integral parts of this breeding concept are: DNA-Analysis for preventing to breed from hybrids, to test yards for pure breed Mellifera queens, analysis of the tested colonies with Beebreed, establish drone safe mountain mating stations with certified drone colonies as well as create and manage conservation regions in which no other bee species than Amm could be held. Maintain genetic diversity within such an ecotype population is the basic idea. Alpine valleys, surrounded by protecting mountains and only one opening to the "outside world" are ideally suited as conservation regions. The canton of Glarus with about 900 colonies is the first one, established over 30 years ago.

To establish a new conservation region, as done recently in the Val Müstair, requires considering various aspects, as a likely spot, a favourable social/economic environment, prevailing Mellifera population of a suitable size is nearly a must, bee keepers commitment, getting funds and constitute an engaged team to run the project.

The Val Müstair in the south east of the Canton of Grisons opens towards Italy and is accessible from Switzerland over a 2100 m a. s. l. high pass. It is on three sides fully surrounded by high mountains. It is 20 km long and at the valley base approx. 4 km wide. Twenty beekeepers keep about 300 colonies. After WW II this originally pure Mellifera population got heavily hybridised by Carnica. The large majority of the beekeepers where not happy with this situation and so in 2006 when the Biosphere Reserve Val Müstair - National Park project was in the realization phase, the local bee keepers proposed a partial Biosphere project intended to re-establish a uniform Apis mellifera mellifera population.



The well protected Val Müstair valley opens towards Italy only

Basic Requirements fulfilled

Happily the context was very favourable for such a project: well protected region from natural external bees' migration and of suitable size in area and amount of colonies. So the beekeepers decided unanimously to file such a project. Very encouraging was, in comparison to other similar projects, the fact to be part of a local superordinated project. Positive signs of the Biosphere organisation were obtained previously. The arguments to re-establish the population of an endangered bee species were very convincing.

The UNESCO Biosphere project stays for:

- Sensible acting in combination with:
  - Society and culture
  - Nature and environment
  - Ecology and economy
- Strong and sustainable living space

Bees and bee keeping fit very well in this frame.

Submission of project

A project was established with members of the local bee keepers association, VSMB, Pro Specie Rara and in the second phase of Apisuisse, too. The submission described the actual situation, gave arguments and stipulated goals of the project. The latter included: the re-establishment of a pure bred Mellifera population favouring the local bee and up-grading the local mating station with pure bred drone colonies. The breeding concept should be run according to the Apisuisse regulations.


Mating station Tschucai at 2000 m a.s.l. in a well isolated high mountain valley

The implementation required measures on various levels, as:

- Breeding from local pure Mellifera breed only in view of requeening the local colonies as well as the drone colonies of the mating station.
- Support and training of bee keepers
- Take advantage of the Biosphere label for marketing
- Promote new products, e.g. pollen

The impact of such project was described as a contribution to the conservation of diversity of species, maintain a pure bred gen pool of Amm as well as genetic diversity. The latter will be achieved particularly thanks to the free mating in the valley, which will be possible in a consistent Mellifera population. Improved docility, due to selection and elimination of hybrids will have a positive impact on young bee keepers. Such a project will also be a good example in view of other similar projects.

It is quite clear that the local bee keepers association cannot finance such an undertaking. Considering the national importance of the conservation of endangered livestock and its compatibility with the goals of the Biosphere the latter and the Federal Department of Agriculture would provide the funds. Supporting such a project is fully compatible with the Swiss government's obligation in accordance with the signed UN-convention for maintaining ecological diversity. Total funds for a two phase project of 3 years each accounted for about 200'000.00 CHF (or USD). The bee keepers association and the bee keepers had to contribute to the costs of the project mainly through compulsory labour and paying 10.00 CHF per queen.

The main effort consisted of motivation of beekeepers, searching for quality pure bred colonies in the valley, queen breeding of them and requeening. This work was mainly done by competent and engaged local leaders. During the entire period of 6 years about 500 queens were produced and distributed. Most of the traditional beekeepers needed help. In the meantime the drone colonies were tested for race purity and up-dated. The mating of all queens took place at the local mating station Tschucai at 2000 m above sea level. The colonies are wintered there.

The selection criteria for queen breeding colonies were for starting rather simple:

- Good properties
- By eye black bee
- Queen all around black
- Morphology:
  - Workers Cubital index: smaller than 1.8; Discoidal shift: negative
  - Drones: Cubital index: smaller than 1.5; Discoidal shift: negative

Very soon we switched over to DNA-Analysis of drone samples according to Gabriele Soland. From then on morphometrie was not any more an official criterium since morphometrie is not sensitive enough particularly for selecting from heavily hybridized populations. The DNA criteria are based on testing of 12 microsatellites. If the introgression by Carnica or Ligustica is lower than 10% the sample is considered as Mellifera typical. This means, since we measure drones, that the colony from which the queen producing these drones was bred, is Mellifera typical.

The results of good work performed over the 6 years are well documented in the two graphics below as follows:

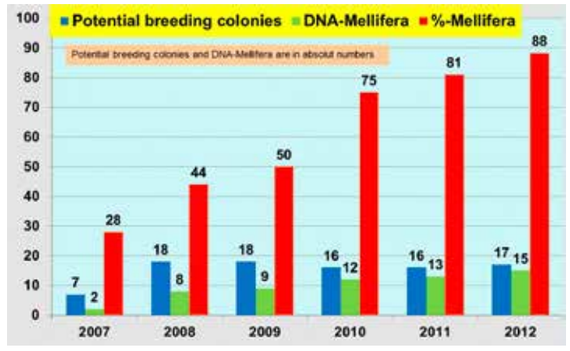


Fig. 1: The potential breeder colonies increased steadily from 2 out of 7 to 15 out of 17.

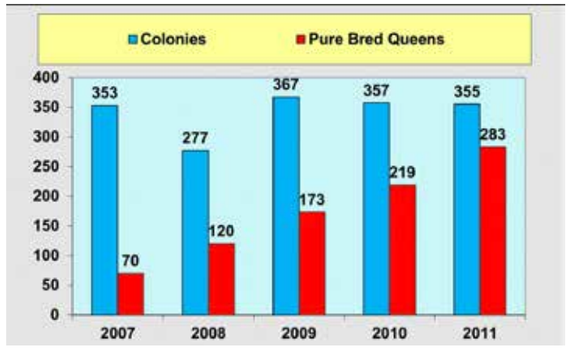


Fig. 2: The colonies with pure bred queens increased in the same period from 70 of 353 to 283 of 355 colonies totally. The difference is mainly due to one bee keeper who is very critical in accepting other queens. We are working to get to a good end there, too.

Concluding one can say that the project was very successful. The major goals were achieved. Some open issues remain, as: complete requeening, establish a show room about bees, introduce new products like pollen and propolis, as well as defining a management strategy for conservation regions and last but not least, obtain a formal legal recognition as dark bee conservation region.

Recognition and thanks to the institutions for the funds and the bee keepers who contributed decisively with their work to the success:

Institutions: UNESCO Biosphere reservation park, Federal Department of Agriculture Bern, Pro Specie Rara, Apisuisse, Swiss Mellifera Bee Friends, VSMB

Bee Keepers Val Müstair:

Duri Prevost, Responsible for breeding and mating stations

Renata Bott, President of BKA Val Müstair

Roger Patterson, British Beekeeper Association **roger-patterson@biconnect.com**
www.dave-cushman.net

Sunday, 2nd September 2012 14.30

Queen Performance Problems

My Beekeeping

- Since 1963
- 130 colonies at one stage
- Now……
  - 30 own colonies
  - 50 in teaching apiary
  - + members
  - Deal with over 200 colonies
- Always raised many queens
- Practical beekeeper
- Observation and logic

Laurent Gauthier, Bee Research Center, Agroscope Liebefeld-Posieux, Switzerland **laurent.gauthier@alp.admin.ch**

Sunday, 2nd September 2012 15.00

Factors affecting honey bee queen quality

The notion of colony vitality is at the core center of beekeeper's concerns. Indeed several factors might impair colony vitality, hence compromising the survival of the colony during winter or the production of honey. These are generally classified as biotic factors, such as parasites or pollen resources of low quality, for instance, and abiotic factors such as climate and agrochemicals. Most of these parameters interfere with each other in a complex network, making the underlying mechanisms responsible of colony weakness difficult to understand.
The impact of these different parameters is usually assessed on individual workers but rarely on the queen. Yet, because the queen is the only reproductive female in the colony, fecundity is a critical issue for the health of honeybee colonies. Any factors affecting the queen's fecundity will stagnate colony development, increasing its susceptibility to opportunistic infections. Queen quality is also a prerequisite for honeybee selection programs as breeding value is generally tested over several years. Symptoms related to queen health are frequently reported by beekeepers such as low fecundity, untimely requeening events, drone laying queens and queen cells abortion during rearing operations. Requeening during the first months after introduction of the queen in a colony is frequently described and it is generally admitted that most of queens do not live longer than two years, even less in some cases. This is a critical issue for breeding programs which usually require the availability of queens throughout several years. Another issue often reported by beekeepers is the queen failure and the consecutive development of drone layer workers. Unless the beekeeper would notice this and introduce a new queen, the colony is usually not able to establish a new mated queen and the colony will ultimately die. The queens displaying such failure have in general a low content of sperm in the spermatheca or spermatozoa with low viability.

This raises the question about the quality of the drones present in the environment where queens are flying for mating. Indeed some reports have found drones with a low sperm count or a low viability sperm count. Spermatozoa production is achieve soon during the drone pupal stage and can still be affected during the adult life. Likewise after mating, the sperm has to stay alive in the spermatheca of the queen. It is then possible that contaminants present in the environment could potentially be toxics for either the spermatogenesis or the subsequent life span of the spermatozoa. For instance it has been shown that acaricides such as coumaphos can impair sperm preservation.

The impact of biotic and abiotic factors on the physiology of the queen is another issue that should be taken into consideration. The queen lay almost its own weight of eggs each day and consequently requires a tremendous amount of food provided by attending bees. Then one can hypothesize that the contamination of food by pathogens or by chemicals would ultimately have an effect on the queen health. This could particularly be relevant for substances which progressively accumulate in the tissues according that the queen live much longer than the workers.

Beekeeping requires nowadays more technical skills than earlier times and a large part of the work is dedicated to the renewal of weak or dead colonies, or colonies judged as non-profitable according to beekeeper economical viewpoints. Queen rearing is then at the center of the labor of beekeepers today and studies need to be implemented in the future in order to understand why queen quality became these recent years a major issue for breeders.

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Sunday, 2nd September 2012 16.00

The Dark Bee in Austria, a regional ecotype

Mit Ende der letzten Eiszeit vor 10 Jahren haben sich die Bienen wieder in Europa angesiedelt. Die Apis mellifera mellifera nördlich der Alpen verbreitet. Die Ligustica und die Carnica südlich der Alpen.

- Mit Ende der letzten Eiszeit vor 10.000 Jahren haben sich die (Honig-) Bienen wieder in Europa angesiedelt. Die Apis Mellifera Mellifera (Dunkle Biene) verbreitete sich nördlich des Alpenhauptkammes und die Apis Mellifera Ligustica und ihre Schwester Apis Mellifera Carnica südlich der Alpen. Der Alpenhauptkamm war auch nach der Eiszeit noch lange eine natürliche Barriere.
- Durch den Handel ab den 19 Jahrhundert hat sich die Carnica auch nördlich der Alpen stark verbreitet, und die Dunkle Biene in Österreich immer mehr zurückgedrängt, diese Verdrängung wurde in den letzten Jahren durch die Einfuhr der Hybridbiene Buckfast und die Italienerbiene nocht verstärkt. Heute ist die Dunkle Bie in Österreich extrem vom Aussterben bedroht und von vielen zum Tode verurteilt. Aber ein altes Sprichwort bei uns heißt „Totgesagte leben länger"! Hoffen wir, dass dies auch bei der Dunklen Biene zutrifft.

Durch den Handel ab den 19 Jahrhundert hat sich die Carnica auch nördlich der Alpen stark verbreitet, und die Dunkle Biene in Österreich immer mehr zurückgedrängt, so das sie Heute in Österreich vom Aussterben bedroht ist, und von einigen als Tot angesehen wird. Aber ein altes Sprichwort bei uns heißt «Totgesagte leben länger» hoffen wir das dies auch bei der Dunklen Biene zutrifft.

Es wird davon abhängen ob wir gute Königinnen zum Verkauf anbieten können, die den Käufer auch überzeugen das die Dunkle es wert ist damit zu arbeiten. Nicht Quantität sonder Qualität wird für das Überleben der Dunklen Biene in Österreich Ausschlaggebend sein. Es genügt auch nicht den Rückgang der Dunklen Biene zu beklagen, sonder wir müssen uns bemühen, erstklassige Königinnen auf den Markt zum Verkauf anbieten. Die Dunkle Biene hat die genetischen und morphometrischen Voraussetzungen dazu sicher noch, und die Nachfrage ist so groß wie nie.

In Österreich (Salzburg/St.Veit i. Pg.) haben sich 2010 die Züchter der Dunklen Biene zusammengefunden und den Verein «Austrian Mellifera Züchter» kurz AMZ aus der Taufe gehoben. AMZ hat seinen Sitz in St.Veit i.Pg. Obmann Alois Reiter. 15 Züchter aus Salzburg, Tirol und Deutschland sind derzeit beim Verein aktiv. Wir versuchen Genetisch, Morphometrisch und Zuchtwert geprüfte Königinnen der Dunklen Biene wieder in unseren Gebiet anzusiedeln.

Die Dunkle Biene ist Jahrhunderte lang die Bodenständige Biene bei uns gewesen, hat sich den klimatischen Verhältnissen angepasst und ist als Ökotyp für viele Pflanzen der Bestäuber schlechthin. Sie ist es wert wie-

der mehr zu Züchten und auf der Belegstelle Schüttbachgraben begatten zu lassen, um Reinrassige Dunkle auf den Markt zu bringen.

Seit einigen Jahren haben wir auch die Möglichkeit unsere Zucht und Drohnenvölker Genetisch zu Untersuchen. Die Untersuchungen der DNA sind 2008 in Dänemark an der Aarhus Universität an 100 Völkern und 2010 an der Maximilian Universität in München an 5 Völker durchgeführt worden. Die Ergebnisse sind 90 – 99›6 % Mellifera mellifera und als zwei Linien «Sbg. Alpenland» und «Nigra AiG» bewertet bzw. beschrieben. Wir haben auch die Möglichkeit über die Künstliche Besamung in einem Jahr eine zweite Linie als Reinzucht begatten zu lassen.

Datenbank beebreed eu: Der Verein «Austrian Mellifera Züchter» kurz AMZ genannt ist auch Mitglied beim Länderinstitut für Bienenkunde in Hohen Neudorf e.V. (LIB) Wir können derzeit 150 Königinnen Jährlich in die Datenbank bei Beebreed Mellifera eingeben. Laut Vertrag ist es möglich auch mehr als 150 Königinnen eingeben, wir müssen dafür aber aufzahlen. Wir haben 2000 mit der Eingabe (lt. Stockkarten) begonnen, und bishehr 129 Königinnen eingegeben und den Zuchtwert berechnen lassen. Ein ganz großes Anliegen ist die Inzucht Berechnung, da wir in Österreich eine sehr kleine Population von Reinzuchtköniginnen haben und die Gefahr der Inzucht sehr groß ist, Wir führen zur Zeit zwei Linien «Salzburger Alpenland» und «Nigra AiG» ist Alpenland inner Gebirg eine weitere Linie könnte in den nächsten Jahren dazu kommen, «Nordbiene» wen die Zuchtwerte vor allen Sanftmut und Wabensitz in Ordnung sind.

Zusammenfassend kann man sagen das die Dunkle Biene derzeit in Österreich dank verschiedener Möglichkeiten in der Werbung eine Wiederauferstehung entgegen geht und wir alles Unternehmen sollten diesen Trend zu nutzen zum wohle unserer «Apis mellifera mellifera»

Dorian J. Pritchard, BSc, Dip Gen, PhD **dorian.pritchard@btinternet.com**
Sunday, 2nd September 2012 16.30

Breeding varroa-resistant bees

Introduction

My first DNA-authenticated native honey bee colony had no Braula coeca, and at that time this was exceptional. It gave me hope that those bees would transfer their apparent intolerance of Braula to Varroa destructor when it arrived in northern England in AD 2000. As it happened, all 4 or 5 strains of native or near-native northern British A.m.mellifera I have managed since then seem to have the capacity to resist varroa and I have given them no relevant treatment since 2002. However, since there were no mites to examine I was unable to deduce the nature of that resistance. Hive JB5 was an exception. It was led by a hybrid, ginger queen of the Jarrow Black line and in May 2010 I found it had a heavy mite infestation. This is its story.

Observations

Colony JB5 built up so rapidly that I needed to remove two brood frames which I transferred to weaker colonies. On the second occasion, in mid-May, I noticed many mites in the hive, so I inserted a varroa floor and began to monitor natural mite drop. Two weeks later the colony swarmed, although there were no queen cells in the hive, and the swarm was lost. At that time the mite drop was 18 per day and despite the official recommendation to treat if the daily drop is 6 or more in May, I left the colony to find its own solution. However I took out two more frames bearing queen cells, from which I established a mating nuke.

Mites were collected every 10 days or so from the main brood box and the count per day plotted for the midpoint of each time interval. When there was little debris on the floor insert fallen mites were counted in situ; when there was much comb debris, this was stirred into a large volume of cooking oil and the mites lifted off its surface on paper kitchen towels. A check showed the second method revealed more carapace fragment, yielding a slightly higher, but broadly similar count.

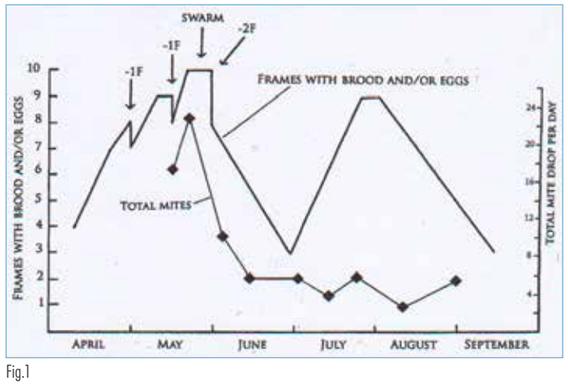

Fig.1

Figure 1 shows the development of the colony, with associated natural mite drop throughout the summer. After reaching a peak of 23 per day at the end of May the drop declined steeply to around 4 per day by mid-June, at which level it remained. The daily mite drop per frame of brood/eggs is shown in Fig. 2, it declined from around 2.2 in May to 0.5 in August.

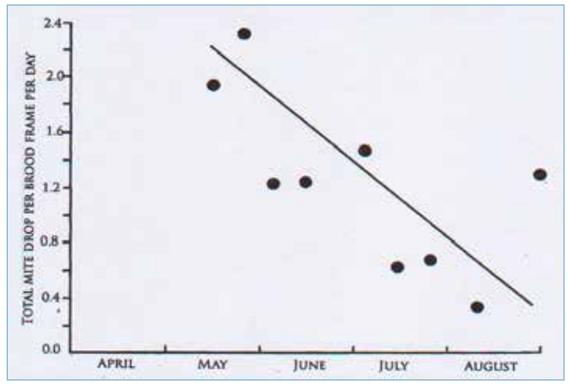

Fig.2

The mite samples were stored at room temperature and inspected visually using a dissecting microscope some 9 months later, when they showed no sign of decomposition. The proportion with severe damage (i.e. loss of one or more limbs, large gashes in the carapace, or only a body fragment remaining) was assessed in each sample (Fig. 3). A very low proportion showed loss of all limbs (Fig. 3; D,H). This could have been due to activity by scavengers among the floor debris, but mites with this level of damage were too few to affect overall numbers.

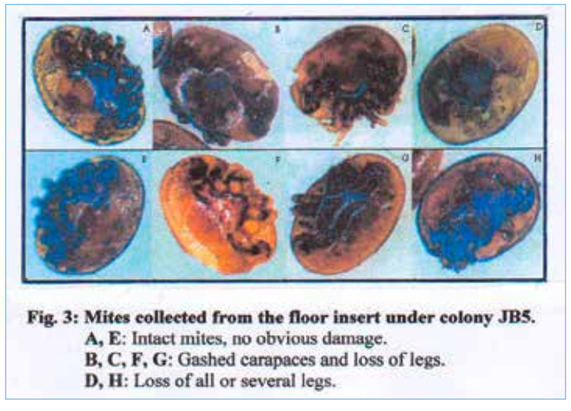

Fig. 3: Mites collected from the floor insert under colony JB5.
A, E: Intact mites, no obvious damage.
B, C, F, G: Gashed carapaces and loss of legs.
D, H: Loss of all or several legs.

Altogether, just under 40% of the mites showed severe damage, the natural fall apparently being increased by

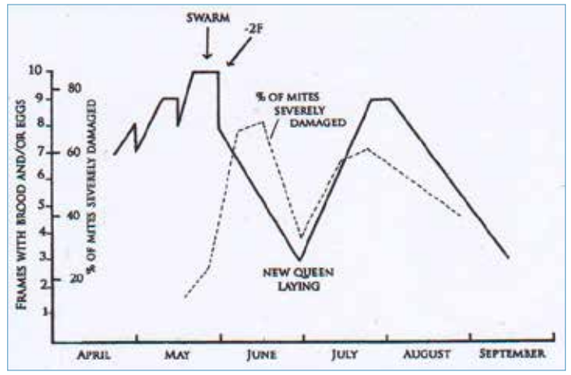

Fig.4

~60% in association with severe damage being inflicted on live mites. The profile of the percentage of mites damaged at each time interval midpoint showed an unexpected similarity to that for brood nest size (Fig. 4). The percentage of damaged mites was therefore expressed per frame of brood/eggs (Fig. 5). This revealed a gradu-

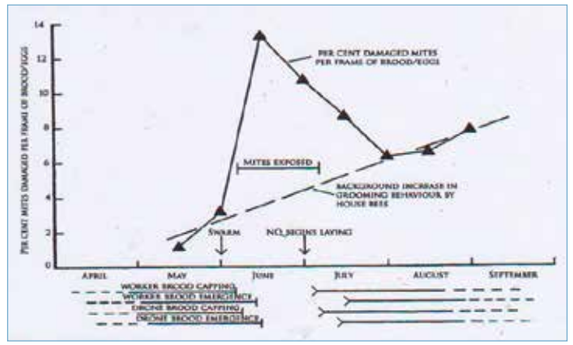

Fig.5

al background increase in damage from 2% in May, to 8% in September, plus a major peak coinciding with the period when no brood was being capped (Fig. 5). However, a puzzle remained: why did the proportion of mites damaged correlate with brood nest size (Fig. 4)?

Discussion

It is generally claimed that a few hundred varroa mites present in a hive early in the season will proliferate and overwhelm a honey bee colony. In the case of JB5 no such development occurred. Instead, following departure of the swarm, mite numbers rapidly fell and never recovered. Nor did infestations build up in the weak colonies supplemented with infested brood, or in the mating nuke set up just after swarming. The subsequent over-winter mite drop in the main colony was negligible and mites were virtually undetectable in the apiary the following year, when both colonies were re-queened.

The damage inflicted on the mites is similar to that described by other observers and ascribed to "grooming behaviour" (i.e. biting) by house bees (e.g. Rodger Dewhurst, Versailles conference, 2006; Ron Hoskins, Aviemore conference, 2009). The general increase in background level damage (Fig. 5) suggests that the bees gradually improved their grooming efficiency over time, as if learning by the colony was involved. The need for learning is a feature described by other workers in this area (John Dews, Rodger Dewhurst, personal communication).
The most dramatic feature of the profile of mite damage per frame of brood/eggs is the major peak corresponding to the interval between final capping of the brood laid by the old queen and the commencement of capping of that laid by her successor (Fig. 5). At this period any mites in the brood nest would have had no hiding place from predatory house bees, as they have within capped cells at other times.

The association between percentage of mites damaged and size of brood nest is most easily explained as being due to a specialist class of mite-killer house bees, the number of which would be expected to relate to colony size.
It is considered that behaviour similar to that inferred in this colony led by a hybrid queen, probably occurs in native and near-native colonies, but with a different dynamic relationship between colony growth and appropriate learning by house bees, so that mite numbers never build up.

Conclusion

It is concluded that resistance to Varroa destructor in the A.m.mellifera of northern England involves acquisition of physical damage by adult mites, which in the case of this hybrid colony increased daily average natural mite drop by ~60%. There was a steady increase in damaged mites amounting to 6% over the season, plus a major peak when brood capping was suspended. This damage is believed to be inflicted on live mites by the house bees. The proportion (as well as the number) of mites damaged varied with colony size, suggestive of a specialized class of mite-killer bees.

Colony JB5 yielded two supers of honey during the summer of 2010. Few mites have been seen subsequently.

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Sunday, 2nd September 2012 17.00

Put your queens on holidays: a broodless method for an efficient varroa control in summer

Laurent Gauthier, Benoit Droz, Vincent Dietemann and Jean-Daniel Charrière

There are three main parameters that influence overwintering of colonies: (a) the size of the colony in fall, (b) the amount of food stores and (c) the Varroa mite infestations during summer and fall. There is indeed accumulating evidence that honey bee colonies should be properly treated in summer against the mite Varroa destructor to avoid colony losses during the next winter. High mite infestations during summer compromise the production of winter bees. Winter bees have an adapted physiology to long wintering periods which extend their lifespan for several months, instead of weeks for summer bees. After overwintering in the cluster, these bees will take care of the larval rearing during the following spring. Winter bees start to be produced in August or September, according to the different locations in Europe. The mechanisms by which varroa impairs the production of winter bees are still not fully understood, in particular it is difficult to distinguish if varroa or its associated viruses are the main cause of the troubles. Nevertheless, there is a clear link between mite infestations and viral loads recorded in individual bees. Therefore beekeepers should treat efficiently during summer otherwise the colonies will produce bees with short life span and will progressively be depleted of workers despite the presence of appropriate food stores.

Formic acid and thymol based treatments are today recommended by authorities in Switzerland to fight against the mite during summer. Despite their proven efficiencies, these treatments are very dependent upon atmospheric conditions and may lead to unexpected drawbacks such as queen losses or insufficient mite treatment efficiency in some cases. To cope with these problems, some beekeepers, especially in Italy, have recently started to cage queens during summer in order to obtain broodless colonies, hence providing the best conditions for treating the mite with oxalic acid. During the year 2012-2013, we have developed an assay to test this method in Bern.

Two groups of colonies (N=6 per group) were differentially treated with either the official formic acid treatment or the queen caging method with oxalic acid treatment. The formic acid treatment was realized between the 7th and the 15th of August 2012 using the FAM-Liebefeld dispenser, with a volume of 130 ml of 70% formic acid. The dispenser was placed on the top of the frames, under an reversed feeder. This treatment was renewed from the 18th until the 30th of September 2012, and completed by an oxalic acid treatment on the 14th of December 2012. The oxalic acid treatment consisted of 2.1% oxalic acid in water sprayed onto each side of frames (3-4 ml on each side).

In the other set of colonies, queens were caged from the 7th until the 29th of august 2012. Upon queen release, colonies were treated with oxalic acid following the protocol described above. Another treatment with oxalic acid was performed on the 14th of December 2012. Mite falls were followed weekly during the course of the experiment. The results showed an equal efficiency between both treatments. Colonies treated with formic acid tend to display a slight decrease of their population until October, while colonies where queens were caged tend to compensate the absence of brood during the 21 day period by either extending the life span of bees and/or producing more brood after queen release (these aspects need still to be addressed).

In summary, bee populations of both groups were equal before winter and the average mite fall was comparable, despite evidence for re-infestations of some colonies from neighbouring infested apiaries. None of the queens died during this assay. We therefore would consider this method as an alternative to the formic acid summer treatment for improving overwintering of colonies in Switzerland.

Yves Elie, Association arbre aux abeilles, France **grand.rue@sfr.fr**
Sunday, 2nd September 2012 17.30

Little brooks make great rivers

ASSOCIATION
L' ARBRE AUX ABEILLES
RUCHE TRONC & ABEILLE NOIRE

France, Languedoc Roussillon / Cévennes ✲ www.ruchetronc.fr

To preserve the black bee it is worth find out again the path of humanity that fits with this special honeybee. To work like Masanobu Fukuoka did in Japan. To find out another kind of relation to the living, to what is surrounding us and makes us live. If we stop being "Fachidioten" like they say in German, then it is not a problem anymore to preserve the black bee.

That is why we are leading a lot of activities and communicating about this way of being with bees.

Here above you can see a group at a workshop with Chantal Jean, beekeeper and secretary of the association.

Practical example. Here you can see from above the "locker" of the hive. It is made of thick wood and isolates perfectly well the bee hive. Notice it is made of three part, which permits to open only one part at once to look if the bees are ok.
So we do not disturb and stress them and do not cool them down. It is a way of working and being with bees that can be used with modern hives as well.

The black-bees of our mountains of the Cévennes are quite small, cold resistant, frugal and very defensive.

Like the black bee of Tyrol, our bees do not like to lack of respect. We really appreciate this capacity they have to be on the defensive.

It is on the opposite of the Buckfast bee. Our black-bee is certainly not an easy bee, and it is not a bee to work with anyhow. So for a while Italian bee or Buckfast, much more practical and easy, got ahead of her. But more and more people ask us for black-bees, because they are ideal and stronger for an apiculture closer to the nature and respectful to the bees.

We are studying and preserving **traditional apiculture of the Cévennes.** We adapt the modern materials and methods to the old way of working with ancient hives. The orientation of our research and work is simple: *Apis mellifera mellifera* is interesting as long as we preserve its natural and particular qualities.

This very specific kind of "wild bee" must not be modified by modern beekeeping techniques and selected for actual productive purposes. Because those methods linked to the common agricultural policy are not adapted to the major aim of our association.

Our aim is to develop well-being for the dark bees and the beekeeper. In that way we want to introduce people to the potential with a future of this bee and the traditional apiculture.

Many of our actions on internet, radio, papers, meeting or outdoor workshops are made to present the know-how of this traditional apiculture linked to the black-bees.

This is the old man who oriented us towards this traditional apiculture and justified the creation of our association. This man has 93 years old, lives with his wife and has 100 hives of black bees. He is working with modern hives on the basis of the ancient apiculture of our mountains. It is him who is the first member of our association and who is always giving us good advices for our work. You can watch him work in a documentary that can be seen on our website: www.ruchetronc.fr

You can always send him a postcard from your country with bees or hives, he will be very happy. Here is his address:
M. Paul Chapelle – Plaisance
48220 – Fraissinet de Lozère – France

Our protective apiary is not made to spread dark bee swarm. But to answer to the demand of beekeepers and help young professionals that wants dark bees, we are starting to create a special insemination site, in a very isolated place, in a specific Mediterranean mountain biotope.

It is a protected area, a place of refuge for those *Apis mellifera mellifera* who came there from all over Europe.

The same bee that is gathering us now in Switzerland for this nice meeting.

Apis mellifera mellifera, the **"dark bee"**, appeared in south of France around 14 000 years ago.
It came in a natural process of evolution, because of the big glaciation the bees were forced to come more southern part of France.

This bee stemming from natural selection has fed and enchanted many generation of Europeans for thousand years. In the very specific biotope of the Cévennes, we are working on preserving the black-bee and the traditional apiculture linked to it.
This biotope is a privileged ground and after genetics measures made in France, 97% of black-bees were found in the Cévennes, specially in the department of Lozère were we work.

What we see in a **"tree hive"** help us to be aware of the bee, to be closer to her and build an emotional relationship with her, which is probably the most important condition to protect and preserve her.

For many years we are catching colonies of dark bees we find in old abandoned tree hives in different places of the Cévennes. This helped us to build a protective apiary, at the start with the help of scientists and molecular analysis. But this was a system in which we were asking too much to the scientists and their mission was not really to help us.

Nowadays we are simply working with our own beekeeper experience and sensitivity. Will you ever ask a Navajo if he has genetic analysis that proves him his Mustang horse is a real Mustang or not?

For our bees it is the same. What the ancient teach us allows us to recognise if we are in front of dark bees or not from the point of views of a beekeeper.

It is an urgency to come back to what is the most simple and essential.
Let the science be the science, the bees be bees and the beekeeper be beekeeper…

This place will be part of an european itinerary, to tell the amazing story of the dark bee.

It is a very big story we can tell all together

Balser Fried, Swiss Mellifera Bee Friends Assocation **fried@mellifera.ch**
Sunday, 3nd September 2012 09.00

Perspectives for a sustainable control of European Foulbrood (EFB)

The EFB epidemic has increased steadily in Switzerland since 1998, with an average of 35 new cases being registered every year (Fig. 1). Since 1999, the number has increased exponentially and reached 994 in 2010. Between 2007 and 2010, in the district of Werdenberg, 300 colonies had to be destroyed because of the disease (Fig. 2). This corresponds to one third of the original honey bee population of the area. The end of the epidemic could not be foreseen, which was very discouraging to the whole beekeeping community. In such circumstances, according to the legal ordinance for epizootics in Switzerland, all clinically diseased hives in an apiary must be destroyed, since use of antibiotics is forbidden. In this very serious situation the bee keepers of the area voluntarily decided to treat their hives with the so-called "closed shook swarm method" (Swiss Textbook Bienenvater, 1920; Waite, 2004) following the honey harvest in the fall of 2010.

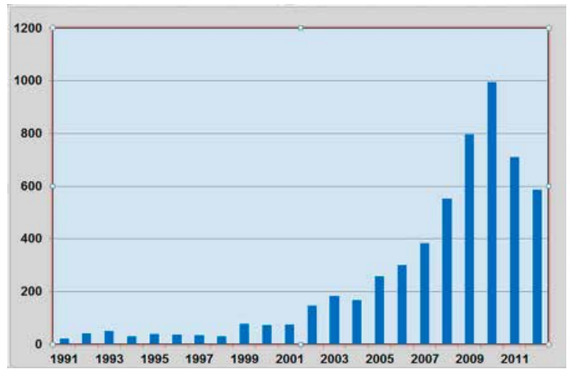

Figure. 1: Number of attack cases of European Foul Brood in Switzerland between 1991-2012. Source: https://www.infosm.bvet.admin.ch/public/awzeit/auswertung/

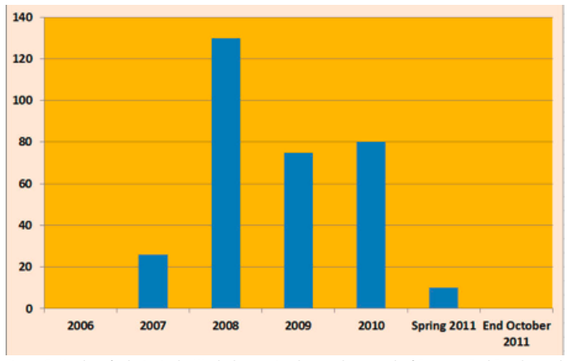

Figure. 2: Number of colonies in the Werdenberg region destroyed as a result of European Foul Brood control operations from 2006 to end of October 2011.

The method used is outlined in Table 1 but in our case a major advance was the introduction of molecular tools, with the PCR being used to detect and diagnose the causal agent; info.igv@vd.ch)

Pilot studies with this very sensitive technique showed that the causal agent of EFB, Melissococcus pluton, can be present in a colony that shows no overt symptoms of disease. Unless all colonies in the area are subjected to treatment, in the absence of a technique such as PCR, recurrent infections are therefore unavoidable. Destroying only clinically sick hives, as required by law, would therefore not achieve the desired outcome of eradication of EFB. However, with PCR in combination with the shook swarm method, the possibility arose of eliminating the hidden causal agent from contaminated but apparently healthy hives. In order to reduce operational costs, PCR analysis can be performed on pooled samples from up to 10 hives. In the case of positive results, all the hives represented in the pooled sample must be treated to avoid cross contamination within the bee house. Following this line, all bee keepers in the infected area whose hives showed positive PCR reactions for M. pluton treated all their colonies by the closed shook swarm method (Tab. 1). Their artificial swarms were then transferred onto new frames and foundation in cleaned and disinfected hives. For each analysis, about 100 bees from open brood frames of individual hives, or groups of hives, are collected by shaking them into a box, then catching them in a matchbox or other small container. Samples should contain about the same number of bees from each hive. They are then stored overnight in a deep freeze at -200 C, before being sent to the laboratory for analysis. The cost of one PCR analysis is 80 CHF, about 100 USD.

Results

Results of this experiment are presented in Figures 3 and 4. The two maps show the extent of the epidemic in the area of Werdenberg, in 2010 before the sanitation operation and in April 2011 after the sanitation (Fried, 2011). The distance from north to south is 15 km. The core incidence of disease was in the northern part of the area, where the shook swarm method was most diligently applied. Less attention was paid to the southern part in 2010, as it was outside the legally restricted zone. In 2011 it was assumed that by then the bacteria had probably spread to the southern area also.
At the check-up in spring 2011, only 4 PCR positive bee houses were found: 2 from inside the legally restricted zone and 2 in the south, from outside the zone. Sanitation was carried out according to two strategies. In 2 heavily infected apiaries all colonies were killed (blue dots). The other 2 apiaries had few infected colonies and

Task	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12
Establish shook swarm and let it fly from it's hive												
After flying put swarm in cellar detention at approx. 10°C	*											
Cellar detention for 3 days												
Feed shook swarm			*									
Cleaning up and disinfection of hives and material												
Dispose of all brood and feeding combs												
Apiary is cleaned and ready				*								
Put the box with the shook swarm back in it's original hive				*								
Let it fly for one day												
Place it back on clean frames with new foundation												
Feed the swarm and build it up						*		continue feeding				
Check for brood												
Varroa treatment before capping											*	
Legend	*	Milestone				Task						

Table 1: Work plan for performing the shook swarm method. For a successful sanitation, a clear plan of activities is required. It is mandatory that while the bees are in cellar detention, the thorough cleaning and disinfection of the hives and material takes place to provide a subsequent clean housing for the bees.

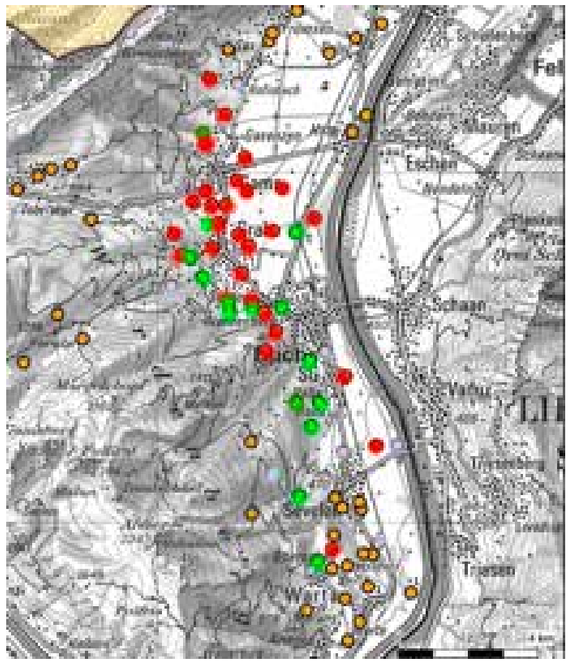

Figure. 3: Map of the infested region in Werdenberg district before sanitation in 2010.
Red dots: PCR-positive apiaries; green dots: PCR negative apiaries: yellow dots: untested apiaries.

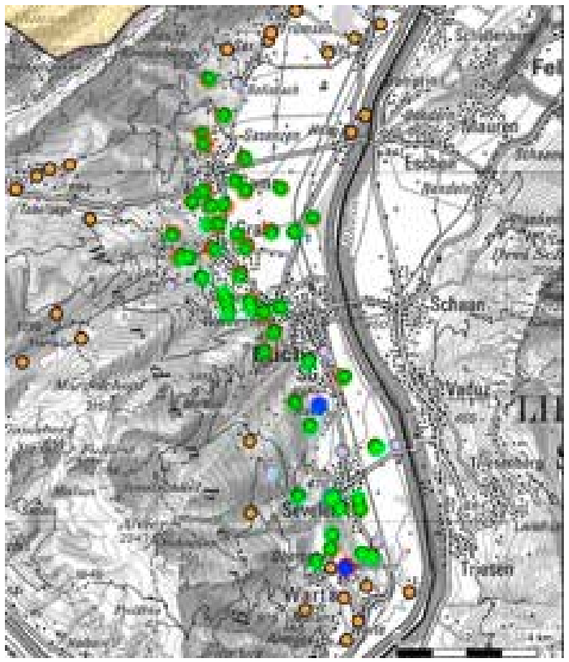

Figure. 4: Map of the sanitized area spring 2011. Green dots: PCR-negative apiaries; blue dots: apiaries in which all colonies were destroyed; yellow dots: untested.

were sanitized by selective killing of just the PCR-positive colonies, as identified by single hive PCR analysis. The advantage of the latter, selective treatment was that healthy colonies were not disturbed by the shook swarm process during the important spring build-up. The largest number of colonies in the area is maintained in hives referred to as "Swiss hives" which are kept in bee houses. Others are kept out of doors, in standard hives such as Langstroth. Both the colonies held in Swiss hives and the others in standard hives were affected, but both were cleaned up successfully using the shook swarm method. "Swiss hives" maintained in close proximity within bee houses therefore do not seem to be an exacerbating factor for spread of EFB.

Overwintering of the disinfected colonies was highly successful. Losses in the winter of 2010/2011 were significantly lower than the commonly observed 10% in our area and shook-swarm colonies developed very nicely the following spring. Implementation of the artificial shook swarm method in the previous fall therefore did not weaken colonies for the next season; on the contrary, subsequent honey yields were more than satisfactory. Thanks to a relatively large number of swarms, previous numbers of colonies per bee house could be restored and beekeepers were sufficiently encouraged to risk restocking abandoned bee houses. In addition, it became possible to reintroduce queen rearing and 150 queens were placed for mating.

Today, we can say that in the central zone of sanitation, the Werdenberg district, where sanitation started in 2010, no new cases of EFB occurred until now (May, 2012). In the meantime, the Government Authorities of Veterinary Health (BVET) published new directives for sanitation of EFB (Technische Weisungen of March, 12th, 2012). They include the shook swarm method described in the paper presented here.

Discussion

The clean-up with the shook swarm method as applied in the Werdenberg area and other places is labour- and material-intensive and requires an input encompassing all affected locations. However, as shown in our case, with concentrated effort it now seems possible to bring an EFB epidemic under control.
Our results suggest that with the shook swarm method, in combination with PCR, an end to the horror is in sight. In addition, as the sanitation operation takes place after the honey harvest and before winter, the method may also be effective against Varroa, as no covered brood is present at that time and the mites would be fully exposed to any appropriate treatment. Apart from efficient sanitation, however, it is necessary that beekeepers observe good beekeeping practices in general and select colonies with excellent hygienic behaviour for breeding. The new "Apisuisse" (the umbrella organisation of Swiss beekeeping associations) breeding concept, with test yards for queens and mating stations with selected drone producing colonies, offers an excellent basis for that goal (www.beebreed.eu). Considering all the measures described here, we believe it will be possible in the future to enjoy beekeeping again, without devastating attacks by EFB.

Acknowledgment

The author is thankful to Padruot Fried for rearranging and translating this article and Dorian Pritchard for comments and final corrections of the English language.

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Private information from Luzi Caviezel, bee keeper, Plantahof, Landquart

Eoghan MacGiolla Coda, Galtee Beebreeding Group, Ireland eemac@eircom.net
Monday, 3nd September 2012 9.30

The Potential of the Dark Bee, Apis mellifera mellifera, for Commercial Honey Production under Irish Climatic Conditions

The Potential of the Dark Bee, *Apis mellifera mellifera*, for Commercial Honey Production under Irish Climatic Conditions

Eoghan Mac Giolla Coda

"One hope for the Dark European Bee is to convince beekeepers, especially commercial bee-keepers, that this bee produces viable quantities of honey under the climatic conditions of the regions to which it is indigenous."

Outline

- Beekeeping in Ireland
- Ireland's Climate
- The Dark Bee in Ireland
- Honey Productivity of the Dark Bee under Irish Conditions
- Characteristics of the Dark Bee of Rele vance to Commercial Beekeeping

Irish Beekeeping Industry

- Approx. 3,000-3,500 beekeepers
- Vast majority of beekeepers are hobbyists
- Only a handful of professional or semi-professional beekeepers
- Very little direct governmental involvement
- No bee inspection service
- Almost all education and mentoring is provided on a voluntary basis

Irish Honey Market

- Approx. 85-90% of honey is imported
- Demand for Irish honey far outstrips supply
- Most honey sold directly by beekeepers on a local basis
- Retails at approx. 12-20 euro per kg
- Irish honey is almost always multifloral

The Dark Bee in Ireland

- Pre-1900: Infrequent, sporadic imports of bees
- 1912: Isle of Wight Disease
- 1920's-1930's: Imports of Dutch black bees
- 1920's-1970's: Imports of Italian bees (A. m. ligustica)
- Post-1980's: Increasing awareness of native bee
- 1991: Founding of Galtee Bee Breeding Group
- mid-1990's: First morphometry study of Irish Bees and DNA testing
- 2009: Conservation of A. m. mellifera made an objective of the Federation of Irish Beekeepers' Associations
- 2007-11: Nationwide morphometry study

Summer 2011

- May: Warm, drier than normal
- June: Wet, temperatures below normal
- July: Dry and very cool
- August: Dry and cool

Average Yields per Colony

- Poor Years: 10 – 30 kg
- Average Years: 20 – 40 kg
- Good Years: 30 – 60+ kg

Brood-Nesting Behaviour

Brood-Nesting Behaviour

- Generally small, compact brood nest
- Gradual build-up of nest, depending very much on weather
- Colony often concentrates more on fora ging rather than brood production, especially early in the season
- If conditions are poor, queen will slow down rate of egg laying and hence rate of brood expansion
- Brood pattern quite variable but often very good

Longevity

- Queens tend to be long lived and can be still fertile into fourth year (and even beyond)
- Workers also tend to live long
- Along with gradual brood increase, this generally gives high forager to brood ratio

Flying Behaviour

- Forages in very cool temperatures (<10°C)
- Will even work in mist or very light rain
- Very responsive to changing weather patterns
- Queens and drones also fly in cool conditions

Temperament

- Very docile in pure form
- Docility permits bees to be handled at low temperatures
- Hybrids with other sub-species can be very aggressive

Over-wintering

- Forms small, tight, compact cluster
- Requires relatively low quantity of stores and therefore little feeding
- Can handle stores with high solid matter (e.g. ivy and ling heather honey)
- Can survive long periods of confinement
- Colonies with low populations have a relatively high probability of survival
- Can cope with mild, wet and cold winters

Behaviour on Comb

- **Tendency to "run" on comb**
- **Cool-air clustering and abandonment of brood**
- **Can make it difficult to find queen and expose brood to chilling**
- **These traits can be readily selected against in breeding**

Pollen Gathering and Storage

- **Collect considerable amounts of pollen at all times of year**
- **Store pollen all around the brood nest (in cluding underneath) and even within the brood nest**
- **Pollen does not appear to prevent expan sion of brood nest**
- **Quantities of pollen gathered have signifi cant commercial potential**

Propolisation

- **Dark bees generally collect considerable amounts of propolis**
- **"Stickiness" is not a major problem due to generally mild conditions**
- **May have significant hygiene benefits**
- **Has commercial implications**

Comb Production

- **Dark bee is very good at capping honey**
- **Generally very white cappings with clear ly defined hexagonal pattern**
- **Good air space underneath capping, which aids uncapping process**
- **Combs have good aesthetic appearance and are readily saleable**

Disease Resistance

- **American foul brood**
- **European foul brood**
- **Chalk brood**
- **Varroa**
- **Hygienic and grooming behaviour**

Conclusions

- ***The Dark European Bee is ideally adapted to Ireland's changeable and unpredictable weather conditions.***
- ***It is probably the only honey bee that can consistently produce significant surpluses of honey under these conditions.***
- ***It is therefore the only bee viable for commercial beekeeping in Ireland (and probably other parts of northern Europe).***

Reto Soland, breading head of mellifera.ch **soland@mellifera.ch**
Monday, 3nd September 2012 10.00

Queen breeding in Switzerland

The introduction of mobile beekeeping after 1860 brought larger interest in beekeeping in Switzerland. Numerous foundations of beekeeping societies and pioneering works, like the 1884 system of scales, hives to weigh and record honey yield in different regions or the 1898 establishment of a honey control system is proof of this rise. The activity did not stop there. Foreign bee races from the Mediterranean came in use by some beekeepers. Some liked the swarming zest of the Carnica race, which filled their beehives. Others liked the docile Italian Ligustica bee or crosses. Experiences gained were reported and published in the Swiss beekeeping journal under the title «Seasonal Reports of the State of Beekeeping". Ulrich Kramer, president of the Swiss German Beekeeper's Association, stated: ... there is one thing our native races are ahead of the hybrid species, they are adapted to our climate and therefore constant and certain in their heredity. Kramer therefore realised that the best results will come most likely from selective breeding of the climatically best adapted bee having a stable heredity trait.

Kramer together with some other queen breeders started a pioneering work that soon became known internationally. The world's first mating yards run by beekeepers associations opened in 1898.
In the same year Kramer published the first edition of his book «Pure Race Breeding for Swiss Beekeepers". The book underwent eleven editions until 1979. Browsing through it one witnesses Kramers constant search for new and practical solutions to beekeeping. Special mention deserves Kramers system of quality assessments for bee colonies. He was the first who systematically graded bee colonies by assigning them points. His system is still in use today; the best value for an attribute is a 4; the worst a 1. In 1914, when Kramer deceased, 48 mating yards were in operation and 318 queen breeders had 2959 queens mated.

Kramer was followed by Meinrad Jüstrich, St. Gallen. During his time the highest growth of queen rearing activity was achieved. After 20 years the numbers of mating yards increased from 48 to 150; the number of queen rearers grew from 318 to 1500. Equally impressive were the results. Jüstrich calculated that between 1915 to 1926 the honey yield of colonies with selected queens was 16% or 4.5kg higher per hive as in hives with no selected queens. The calculation was based on 52›000 selected and 10›000 not selected queens. Another positive result was to improve winter stores. Taken together one main target was reached: An above average yield together with a surpassing quality.

In 1940 Dr Martin Hunkeler, Altishofen, took over the job from the deceased Meinrad Jüstrich and under his guidance queen breeding reached its peak. Compared to today these are impressive numbers: 1'500 active queen breeders, 15›000 mated queens and 225 mating yards. However, in the words of Dr Hunkeler: «... this describes only the outer boundary of our efforts. Much more important are the inner values. Most queen breeders strive for pure race breeding that satisfy performance and physical appearance. ... Our Nigra bee is known internationally. We are approaching Kramer's ambitious aim. However, there is still a lot to do."

Dr Hunkeler went on to explain what he meant. His accurate words are still valid today and their meaning played an important role in 2008 when the queen breeding program was reorganised.

«I ask myself why we did not come further and why we have so much difficulty to hold on and to accomplish our task. The answer lies very often in negligence: Queen rearing should be based on extensively graded colonies which are also tested for their performance. However, in reality many queen rearers depend only on their instinct and memory, i.e. not based on written memos and detailed bookkeeping. This haphazard way may work for some time but is not a stable basis for good results in the future. Bad decisions will show their negative results after two to three years when the much acclaimed breeding stock will not live up to expectation and time and efforts are lost. Many breeding groups fall into this self-made trap."

Dr Hunkeler asked from each queen breeding group a systematic strategy: Tenacious grading of colonies together with a correct herd book. Drone colonies for the mating yard and breeding stock should only come from locally adapted strains. Breeding stock from outside should only be used in urgent circumstances.
After 50 years of efforts Mellifera typical breeding stock was widely available and uniform. In 1960 there were 300 active queen breeding groups at work selecting breeding stock and drone colonies for 250 mating yards.

The structure of queen breeding was decisively shaped by these two men. The beekeepers in Switzerland owe them respect for their persistence, organisational as well as educational skills.

After World War II, far reaching discoveries were made. It was proven that drones and queens fly a long distance (> 6km) for mating and that queens mate with up to 20 drones. This questioned the traditional way of queen breeding, and especially the maximum placement of mating yards. To put this new knowledge into practical use was the job of Prof Dr Fritz Kobel, a former director

of the National Agricultural Research Station in Wädenswil, Zurich.

To actualise instruction of the breeders Prof Kobel rewrote the breeding textbook, published in 1968 under a new title «Pure Race Breeding in Honeybees“. The content was up to date and included all new discoveries. Prof Kobel was keen in transforming the scientific knowledge into practical use. In a letter he stated factually: «It was fatally wrong to ignore the fact that drones and queens fly great distances for mating, even though it was experimentally proven in the USA some time ago. Our mating yards very often are not isolated enough and that’s why selection was not as successful as it was meant to be. Nevertheless queen rearing made a lot of progress since Kramers time. A lot of beekeepers learned the skill to raise their own queens, which is very valuable. It is my duty now to convince our beekeepers to change the old habits.“

Prof Kobel went to work and declared mating yards in the flat countryside of little use, equivalent to local matings in the apiary. Alternatively he fully recognised the value and results of 70 years of queen rearing with grading and keeping a herd book.
Under his guidance isolated mating yards in the mountains were opened. The clear distinction between pure race and common mating yards was introduced, each with its own benefit to beekeeping. Both types are still in use today and are financially supported.

In 1963 -1965 Prof Kobel directed a comprehensive comparison between the Mellifera and Carnica races. The results were inclined towards the Carnica, even though the best Mellifera were as good as the Carnica. On average, the honey yield was 20% less in the Mellifera colonies and 21% Mellifera vs 38% of the Carnica colonies were in the highest ranks of honey yield. The conclusion was that the Mellifera had the same potential as the Carnica. However, the Carnica came from pure mating yards, whereas, most Mellifera did not, demonstrating the result of failed matings with foreign drones. This subject is a current one even today. How do we ensure pure drone mating in order to get bee colonies with even performances?

The 1960s marked the beginning of the introduction of the Carnica to Switzerland. In 1965 the first three Carnica mating yards were recognised. This was in the hope that further introductions would not follow. To no avail! The ban for Carnica advertisements in the Swiss Bee Journal was lifted a short time later and in 1966 the Carnica Breeders formed their own association.

In 1976, at the age of 80, Prof Dr Fritz Kobel passed on his job to Josef Krieg who took over as new head of queen breeding on the board of the Swiss-German Beekeepers Association. Josef Krieg was an instructor at the Cantonal Institute of Agriculture in Pfäffikon, Zurich. Already in the 1930s Krieg began with breeding and cooperated with the comparative tests of bee strains at the National Institute for Acriculture in Wädenswil, Zurich. In 1960 Josef Krieg became a member of the breeding commission of VDRB and as head of the department he accomplished the comparative tests.

In 1975, new regulations to queen rearing in the Swiss German Beekeepers Association (VDRB) came into being. Breeders and breeding organizations of the Mellifera were supported. The Carnica breeders enjoyed the same rights if they fulfilled the obligations for the Mellifera breeders.

The regulations still had a clear imprint of the old Mellifera breeding system. Financial support, as well as control by the VDRB-breed head was promoted for areas that were important for the maintenance and development of the Swiss Mellifera Breeding.

- Mated queens from mating yards
- Queens of good parentage with mating at apiaries
- Keeping of herd books on the number of records
- Hive testing results with record in the herdbook
- Comparative testing of breeding lines with compensation for test queens and hive testing.

Registration and qualitative assessment of the stock is the basis for any maintenance and development of a breeding population. The regulations of 1975 had placed a clear emphasis here and gave a framework for the activities of the breeders.

In the 1970s and ‹80s there were a number of Carnica mating yards officially recognized and Mellifera breeding was in continual decline.

In 1970 there was 13% of all mating yard-bred queens Carnica, 1989 41% and 1995 exceeded the production of Carnica queens the mark of 50%, achieving today the mark of 65%.

Josef Krieg, in 1988, provided a review of the breeding work in the Swiss German Beekeepers Association (VDRB) 1974 to 1987. Thus, the total number of queens around 1985 declined sharply. The beekeepers were in shock after the varroa mite appeared for the first time in 1985. Even small, local mating yards were closed, and breeding head Josef Krieg tried in vain to dissuade the breeders from these unrefracting closures. In 1987, only 441 breeders were active and Josef Krieg asked: «Shouldn’t we be ashamed in front of our fathers and grandfathers? They have taken breeding seriously and thus significantly contributed to the success of our present-day Swiss Mellifera.“

The shift toward the Carnica race took place not only numerically but also had effects on regulations and staffing within the Swiss German Beekeepers Association.
In 1990, after Josef Krieg had left his post, the office was no longer occupied and a temporary solution was found. Krieg was the last leader in the VDRB, who really held the executive responsibility for the Mellifera breeding. The management of the breeding system by the Swiss-German Association was in continuous decay, which can be recognized by the absence of annual reports and the non-existence of Breeding Commission meetings.

An exception was the breeding regulations of 1995, which came into force under breeding head Hans-Georg Wenzel. This is compared to the old regulations of 1975 a clear shift in weight that supported a further shifting of areas to the Carniolan race. Whereas the efforts to maintain indigenous breeds were sidelined. The recognition and subsidies for mating yards with fewer than 100 matings were dropped, as were the means to local herdbooks and hive testing. Instead, the supply of pure breeding material from a few central sources, or by importing was generously subsidized. Hive testing occured only with respect to purebreed mating yards. Breeding groups were only encouraged to achieve an annual minimum of 100 mated queens.

As the subsidies were abolished, the control, promotion and training by the breeding chief also ceased. The concept of breeding VDRB 95 put an end to traditional hive testing and management of herdbooks by local groups. The consequences were very serious.

Breeding groups that neither manage a herdbook nor test hives, have no overview of the queens of their members and are no longer in a position to make select decisions themselves. So the breeding group ceases to keep and develop its part of the breeding population.

In its place there had been formed a tremendous emphasis on the purebreed mating yards: from here was now «the good breeds» to get, that before had been under local control. What breeding groups failed to maintain, they expected now others to do: The holders of the purebreed mating yard should now run the breeding population. The head of the purebreed mating yard became a service provider producing good breeding material that was provided breeding groups with subsidies from the association.

If we asked breeding group representatives to set up a test apiary and be concerned themselves for the production of pure breeding queens, we often received answers as this: «We don’t need this, we can get good breeds from the purebreed mating yards».

They did not want to see that the head of the pure breeding yard had more and more difficulties to maintain an adequate breeding population. In several cases it came to a narrowing or collapse of the mating yard-based «breeding population.» This change of system was favorable to breeders of the Carnica: what was imported from abroad, could be passed on to pure breeding yards and multiplied by the thousands with financial support. The breeding population was standing in Austria, Germany and Slovenia. Others were concerned for its maintenance.

Around 2005, breeding of the native Dark Bee stood in an existential crisis that was never seen before. Three of six purebreed mating yards had lost their breeding population partially or completely. The European foulbrood destroyed only what would have collapsed with time.

Mellifera.ch takes over control

In 2007, the committee of mellifera.ch set up a working group «breeding concept“, which worked out, as a first step, a recording of the current breeding lines. Twenty years before the head of breeding of the VDRB recieved the herdbooks annually and was able to get a picture. In 2007 one was forced to launch a survey. The result was an urgent need. The population of all purebreed mating yards was based only on 10-12 test apiaries with 100-140 hives. A scheduled composition of the test apiaries and a useful performance test could – with a few exceptions – not be observed.

Either the Mellifera had to withdraw into protected areas and shrink over time to a few residues, or the breeders took a new effort, thus securing a freedom of movement for the future.

The technical recommendations on the methods of performance testing of Apimondia 1972 and later the methods of the German Association for Varroa tolerance breeding (AGT), allowed us to develop a decentralized model for test apiaries with central ring exchange for test queens. In principle, the concept is to lead the breeders again to an individual independence. Each breeder is called up to participate in the management and selection of the breeding population, whether as an individual breeder or as member of a breeding group.

2008 saw the first anonymous exchange of queens when 84 test queens were distributed to seven test apiaries. The

functions of the pure breeder, test director and mating yard manager received clear requirements in the context of the Community of the Dark Bee Breeders of Switzerland. This community had a positive growth in recent years; in 2009 there were 12 test apiaries, in 2010 and 2011, there were 19, and in 2012 there were 21 test apiaries equipped with 252 queens for later grading.

A fortunate circumstance was the reorganization of the Swiss Federal breeding system. In 2010 the Honey Bee was inducted into the stockbreeding Ordinance of the Federal Office of Agriculture, which paved the way for federal funding. Instead of the Swiss German Beekeepers Association there is now «apisuisse" acting as a neutral corporation. In cooperation with the Federal Office of Agriculture, apisuisse sets breeding guidelines and arranges financial support for grading of beehives, managing of mating yards and the herdbook as well as the breeding value estimation. This is offered by the Institute for Bee Research in Hohen Neuendorf / Berlin. This service includes also herdbook managing, inbreeding calculation and support in selection decisions. The data is freely accessible to the public through www.beebreed.eu, national association 50.

With this highly urgent renewal Mellifera.ch takes up the older tradition from the time of breeding heads Jüstrich and Hunkeler and proves:

Each pure breed breeder and breeding group has the task to manage and develop a part of the breeding population. Through the rearing of test queens and the establishment of test apiaries, as well as the management of breeding lines. It can not be delegated to others, what appears too much for myself. If someone only sees this, he has to import foreign breeding stock, and breeding becomes dependent on foreign sales breeders. Change of bee race is the necessary consequence of it. Salvation does not come from the purebreed mating yards! These are just tools that need to be in the hands of an active partnership when the breeding population should have qualitative and quantitative value. It is therefore required that at least one appropriate organizational and practical breeding effort to set the basis for the following years. Associations of all kinds in all fields show equal performances. Beekeeping associations can not stand back here. Apisuisse provides the funds of the Swiss Confederation for all breeding activities in accordance with quality requirements. We are in the fortunate position of having today a breeding system as it was before 1990. It provides financial support for the cooperation of pure race breeders, test directors and mating yard managers. Their fields of activity are clearly defined and mellifera.ch actively arranges annual training for them.

The issue of racial purity

What we have today in the breeding population and in the conservation areas, is a sufficient stock of purebreed, indigenous Apis mellifera mellifera. This standard had for a long time been in doubt. Many breeders were disillusioned and breeding work with the Dark Bee was called into question.

However, we can now assume that the import of foreign breeds of 1860-1900 is quantitatively overestimated. The predominantly rural beekeepers in the late 19th Century had neither sense nor purchasing power for mass imports of Carnica and Ligustica. Thus, in our mountainous country, in many places there remained pure stocks. A consistent color breeding had eliminated to a great extent the not indigenous elements. During the years 1898-1960 this native bee population was continued under practically complete exclusion of imports. A maternal tribal breeding was carried out that held together 35 generations of bee queens. The critical years began as recently as 1970. However, it is known which local beekeepers' associations have decided to move to the Carnica and where there never was a decision to change. Thus, there are places like Glarus, Werdenberg and Sarganserland, parts of the two Appenzell, Obwald, part of the Bernese Oberland, where the importation of Carnica and Buckfast is at best sporadic and if so only in recent years. In an effort to distinguish races in breeding, morphometric wing measurements were made since the early 1990s. The application of wing morphometry was carried out systematically varied and turned out to be insufficient as a method in hybrid situations. So the hybrid influence in the breeding population increased strongly.

Only the use of the genetic hybrid test, that has been available since 2007 and from 2010 became mandatory for breeding mothers, has been the necessary success. This test can detect cross-breeding several generations past. Older crossbreedings, however, have been diluted in the progressive reproduction in Mellifera areas so that they can no longer be detected.

To build up the conservation areas, Münstertal (Grisons) and Diemtigtal (Berne), the genetic hybrid test with molecular markers has been used specifically to exclude hybrids.

Another method of analysis which is not able to demonstrate the mixing, but is reliable for an unlimited number of generations back, is the mtDNA analysis. This focuses on the genetic material in the mitochondria. These are like the power stations of the cells. Because of their size, they will only be passed in the egg and do not occur in the sperm. Thus, it can be determined reliably in a long succession of generations back to a primal mother, whether the original queen was Mellifera or Carnica. Both races clearly have a different expression of this genetic material and therefore are clearly distinguishable.

In the 1990s, Prof Bo Vest Pedersen, University of Copenhagen, used mtDNA analysis and demonstrated that the maternal lines of bee populations in Switzerland, England and Scotland are unbroken of mellifera origin. There has been no mistake throughout the generations since the beginning of the importation of foreign breeds in 1860. The mothers always came in a direct line from a mellifera mother.

To the degree of a hybrid influence the mtDNA analysis says nothing, because it analyses only the maternal family tree and does not cover the fathers. Here, this method must be complemented by the hybrid DNA test.

We can assume that in the conservation areas exist for the most part and in the breeding population almost exclusively purebreed stocks. Single, specific crossbreeding events in the past can not be excluded. Recent hybrid influences that are most likely, will be excluded by:

- DNA hybrid testing for each breeding parent
- DNA hybrid testing for the drone hives of pure mating yards

Mixed matings are possible due to inadequate drone security or incidents in mating yards, but are revealed by the continuous analysis of the breeding mothers and deactivated.

Reto Soland
breeding head of Mellifera.ch

Andrew Abraham, Commercial Beekeeper, Scotland **colonsay.oysters.honey@dial.pipex.com**
Monday, 3nd September 2012 11.00

Apis mellifera mellifera in Tasmania

Martin Ennemoser, Imkerschule Imst, Austria **ennemoser.m@tsn.at**
Monday, 3nd September 2012 11.30

The Tyrolean Dark Bee, a subspecies with special characteristics

Amelie Lehebel-Péron, CEFE, UMR 5175 CNRS, France a **meline.lehebel-peron@cefe.cnrs.fr**
Monday, 3nd September 2012 12.00

Black bees and traditional log hives in the Cévennes National Park (South of France): Conservation of natural and cultural heritage

Mathias Götti, Bee instructor, Plantahof **mathias.goetti@plantahof.gr.ch**
Monday, 3nd September 2012 14.00

Visit of the apiary of the Plantahof

Although also in Switzerland the majority of beekeepers are not any more in the guild of professional farmers but interested people from all kind of professions. The basic training and education of beekeepers takes very successfully place at agricultural «high» schools or are organized locally by bee keepers associations. Plantahof is one of the schools and the students studying here are between 16 and 20 years old and beekeeping is offered as a voluntary course.

In addition to basic courses advanced ones are offered including courses on techniques of, e.g. queen rearing and in bee health. As the bee house of Plantahof is located on campus, congress participants were able to visit the bee house and to take a close look at typical «Swiss BEE BOXES» which are in most cases kept inside a bee house. Mathias Götti, the bee specialist and instructor at Plantahof explained beekeeping with the Dark Bee under the local conditions of Landquart.

Front side of the beehouse

„Fruit" of bee labor

Inside the bee house: Mathias Götti explains

Typical «SWISS BOXES»

Visit of the close by orchard

Silvio Hitz, Grüsch **info@imkerhof.ch**
Monday, 3nd September 2012 14.00

Honey tasting

It is a nice habit of SICAMM conferences to taste local honeys. The Canton Grison has a wide variety of different flavors, depending on the altitude and floral environment.

A new experience to most foreign beekeepers is the flavor of honeydew or forest honey. Its source are the exudates of small insects (aphides) sucking on plant sap. In one of the talks a detailed video about this phenomenon was shown.

Tasting honey needs concentration and is a good source for lively conversations

SICAMM President Dorian Pritchard and VSMB Vice-president Ernst Hämmerli tasting honeydew honey

SICAMM General Meeting

At the occasion of each SICAMM conference the traditional general SICAMM meeting is held. Topics at the agenda were the election of the President and the Secretary as well as the allocation of the next conference. Dorian Pritchard, President, and Philip Denwood, secretary, were unanimously confirmed with applause. The place of the next conference remains open. A highlight of each meeting is always the allocation of the Josef Stark award, which is given for outstanding contributions for the conservation of the Dark Bee. Eoghan Mac Giolla Coda was honoured for his great engagement to preserve the Dark Bee in Ireland.

President Dorian Pritchard at the desk in the centre is conducting the debates.
To his right Philip Denwood, secretary and to his left Anna Dilger translating into German.

Eoaghan MacGiolla Coda and Dorian Pritchard, presenting the honorary document

From left: Roger Patterson, Ingvar Arvidsson, Werner Hardegger

Sicamm Conference 2012 Team and Sponsors

The organization of a conference is only feasible with an engaged team.
The following persons made it possible:

Balser Fried
- Project coordinator

Linus Kempter
- Conference registration and coordination with Plantahof
- Program of accompanying persons

Laurent Gauthier
- Scientific program

Hansueli Thomas
- Public relations
- Congress Magazin

Karl Sochor
- Design and printing of the Congress Magazine
- General graphic design

Silvio Hitz
- Entertainment and advertisements

Jürg Senn
- Treasurer

Padruot Fried
- Fund raising
- Assistant to the project coordinator

Ernst Hämmerli
- Team member all-rounder

Florian Sutter
- Team member all-rounder
- Conference mailings

Important partners
Barbara Bättig, Plantahof,
Manager Conference Centre
Mathias Götti, Plantahof, Bee Instructor
Annette von Lerber, Interpreter,
Mgr. avl interprètes
Alejandro Ramos, Interpreter

Organizer of the Technical excursions:
Alpine Bee Mating Station Säntis: Florian Sutter
Dark Bee Protected Region Glarus: Robert Knobel
Swiss Bee Research Institute – Bee Trail:
L. Gauthier – Ernst Hämmerli

Touristic excursion
Alpine Panorama train ride: Padruot Fried

Sponsors:

We thank our sponsors for their support.

Pollen spectra of Buckfast and dark bees honeys in an urban environment

Bernard DELFORGE[1] & Hubert GUERRIAT[2]

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	2010	2011	2010	2011	2011	2010	2011	2011	2010	2011	2011	N
Origin of honeys	Buck. - Spring		Dark bee - Spring			Buck. - Summer			Dark bee - Summer			
Dominant pollens												
Castanea												6
Salix												1
Rosaceae (Amygdaloideae)												2
Secondary pollens												
Rubus												7
Rosaceae (Amygdaloideae)												3
Salix												2
Ranunculus												1
Castanea												1
Aesculus												1
Minor pollens												
Brassicaceae												11
Trifolium												10
Aesculus												9
Tilia												9
Salix												7
Oleaceae												7
Ranunculus												6
Ericaceae												6
Poaceae												6
Taraxacum												6
Rosaceae (Amygdaloideae)												5
Rosaceae												5
Rubus												4
Betula												4
Myosotis												4
Pinaceae												3
Cornus												3
Rutaceae (Evodia)												2
Ribes												2
Alnus												1
Campanulaceae												1
Caprifoliaceae												1
Malvaceae												1
Anacardiaceae												1
Fagus												1
Asteraceae												1
Plantago												1
Total pollen types	10	11	14	15	17	9	11	14	12	15	13	

Table - Pollen analysis of honey samples from buckfast and dark bee colonies

Hypothesis

Native pollinators are assumed to be more effective than non-native ones because of their adaptive characteristics. We tested the assumption that dark bee visits more plant species in Belgium where it is known to be indigenous than buckfast bee does.

Material and method

One group of dark bees colonies and another group of Buckfast strain colonies were kept in the same urban bee yard in Brussels (Belgium).

Honey crops were harvested twice a year (spring and summer honeys) and honey samples were analysed for pollen types. In 2010, each race group provided a mixed honey sample (four honey samples) whereas each colony provided a separate sample in 2011 (seven honey samples).

Results

This study has to be completed in the coming years but early results are very indicative.

General pollen spectra are quite similar whatever the bee races (cf table). Apart from minor differences, dark bee seems to visit *Taraxacum* more frequently. In addition, *Rubus* is a secondary pollen type in dark bee honeys whereas it is a minor pollen in buckfast bee samples.

Main differences between bee races appear when considering number of pollen types : honey samples of buckfast strain usually show less pollen types than those of dark bee; dark bee seems to forage more plant species than buckfast bee does (cf figure).

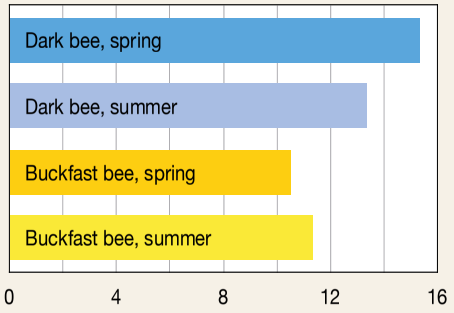

Figure - Mean numbers of pollen types in honey samples from buckfast and dark bee colonies.

Conclusion

These preliminary results could suggest that our assumption is valid : dark bee would be a more generalist forager in its native area than the non native buckfast strain. Breeding dark bee would consequently be more effective in order to conserve plant biodiversity.

Bernard DELFORGE and Hubert GUERRIAT are hobbyist bee breeders in Belgium. Both are members of the bee breeding group of Mellifica ASBL (www.mellifica.be).

Bernard Delforge and Huber Guerriat
Poster: Pollenspectra of Buckfast and Dark Bees