**Obstacles to Greener Beekeeping in France: Anthropological Approach**

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**Abstract**

Over the last few years the amount of space occupied by bees in the French public debate together with the well-known benefits of the products of their hive has attracted the interest of social scientists. Indeed, bees have become a symbol of the biodiversity crisis. Social scientists, like us, are sometimes invited to join multi-disciplinary projects run by biologists specializing in bees. The aim of such involvement is to help the biologists to convince professional beekeepers to make their practices greener, notably with respect to their handling of the Varroa mite. However, the beekeepers we studied in the south of France are not keen to give up their conventional practices. Based on chemical products, these are efficient, simple and cheap as opposed to environmentally friendly, chemical-free techniques (scraping or removal of the brood), which are seen to be riskier and more complicated to implement. This article describes and analyzes these obstacles and the relationship to scientific and non-scientific knowledge they reveal.

**Key words:** beekeepers; apidologists; Provence; Varroa mite; brood; knowledge; exchanges

1. **INTRODUCTION**

Beekeeping is a discreet if not secret activity performed by few individuals: in France, there are only 62,445 beekeepers,[[3]](#footnote-3) out of which 2,573 are professionals (over 150 hives), 2,349 have several activities (50 to 149 hives), and 57,523 are family producers with 1 to 49 hives (FranceAgriMer 2020). Hence, 96 percent of French beekeepers are not professionals, that is, they do not make a living from the product of their hives. The market for honey and other hive-related products, which is very small compared with other agricultural markets, is nevertheless doing well and boasts unparalleled profitability for an agricultural business.

Taking into account the importance of bees as a topic for public discussion and the well-known benefits of hive-related products, as well as the extensive social science research in agriculture, we were surprised when we started our apiological research in 2016 to find so few social science publications related to this topic. Until the end of the 1990s in France, beekeeping attracted very little interest from the social sciences. This is probably due to the fact that the government, the public authorities, the media and French citizens did not feel very concerned.

**1.1 Beekeeping: a small object with a global challenge**

Interest in beekeeping emerged in France in the middle of the 1990s when two movements came together. On the one hand, there was the “Gaucho” crisis. Gaucho was the name of a pesticide belonging to the neonicotinoid family used on sunflower crops. Beekeepers suspected the pesticide of causing an extravagant number of bee deaths. The crisis caused a scandal at the time and people started to hear about Colony Collapse Disorder (CCD) in the United States and in Europe.

While these events were taking place, a new approach was developed by economic science. This entailed “scientifically” costing the monetary value of various *ecosystem services*, including pollination. This *ecological economics* approach’ was founded in the 1980’s, as a multidisciplinary field of academic research by European and American ecologists and economists[[4]](#footnote-4). It was quickly taken up by the media and international institutions: in 2000, the UN launched the *Millenium Ecosystem Assessment,* a vast enterprise employing 1,500 international experts to assess ecosystem services over a four-year period. This research scientifically testified to the monetary and economic value of pollination and thus of bees, both wild and domestic, but also to their environmental value (Gallai and al. 2009). The bee became a sentinel for the environment. The attention of the media, politicians and citizens was captured by the disappearance of bee colonies alongside the discovery of their value.

Given this favorable context from a politico-institutional and media-related point of view, the CCD syndrome took on new meaning. The general public discovered that bees were disappearing but also that they were of great monetary and non-monetary value owing to their pollination activity. The correlation between the two phenomena marked a turning point in the way the topic was addressed by society; the issue of bees gained political ground and gradually became the focus of new social science research.[[5]](#footnote-5) At the same time the price of honey soared and beekeeping became a subject of study because it had become a lucrative business. So too had biological research on beekeeping owing to increased funding!

* 1. **Exchanges between Beekeepers and Scientists**

It is in these favorable circumstances that a group of biologists specializing in bees called upon our help as anthropologists working for the CNRS and INRA. They were involved in several research programs whose aim was to document French beekeepers’ practices and knowledge in two main fields: genetic selection and the fight against the Varroa mite. Having travelled from Asia at the start of the 1980s, the Varroa mite had become a parasite of the European bee.

As with the agricultural world generally, exchanges and ties between professional beekeepers and technical and scientific bodies were long-standing and frequent (Walliser 2015; Pestre, Bonneuil 2015; Vinck 2007). At the end of the Second World War some beekeepers became involved in research projects, lending their apiaries to science for measurements to be performed (Louveaux 2006; Aureille 2014). Thus, they joined in participatory field science projects and, in return, received the results of the research work. Hence, the practice of professional beekeeping has been marked by a constant circulation of scientific and non-scientific knowledge for some time, the aim being to improve bee production and health. Since the war a handful of highly committed amateur beekeepers across Europe and North America has been working closely with biologists (Ruttner 1990; Garnery 1998). The aim of this collaborative and consensual work has been to mix bee populations so that they are more productive and better suited to local climate contexts and floral resources. Over the last few years, their relations have been mired by dissension regarding the possible use of genetic engineering by private companies.[[6]](#footnote-6) Some beekeepers have expressed the concern that applying genetics to bee colonies will eventually lead to patents being filed, just like with the seeds of certain plant crops whose genetic modification has led to farmers being dispossessed of their knowledge and legitimate right to produce seeds (Demeulenaere et al. 2017; Demeulenaere 2018).

Alongside genetics, questions relating to health have occupied another side of the research developed by bee biologists and requiring the collaboration of beekeepers on a regular basis. Indeed, the catalogue of existing treatments proposed by regional bee health support groups is no longer sufficient for solving the problem of recurrent colony infestations by the Varroa mite. Like other parasites to be found on the planet, in France and elsewhere this parasite has gradually become resistant to the chemical products applied every year (Boullier 2019; Boudia and Henry 2015).

Many different chemical products have been used to fight the Varroa mite in France since the 1980s. Until the end of the 1990s, the main product used was Apistan, but then The Varroa mite became resistant to the product’s chemical molecule, fluvalinate (Lodesani, Colombo, and Spreafico 1995). Since then, French beekeepers have mainly used Apivar, which is based on the chemical molecule amitraz. However, for a number of years now, some scientists, such as the ones working’ on our projects, have considered that Varroa mite has also developed resistance to this molecule. To date, this has not yet been scientifically proven (Almejica and al. 2019). Understandably, therefore, it is essential for beekeepers to be able to control infestation. One of the ways to fight against it consists in acting either on the entire brood or only on the male brood[[7]](#footnote-7) where the mite develops in order to prevent the parasite from reproducing.

The biologists’ work is focused on bees and their parasites. They measure and count these at different periods of the year and in different circumstances with respect to reproduction cycle, season, honey flow, and so on. Their measuring work is decontextualized from actual beekeeping as a human animal breeding activity (Decourtye 2018). Their methods do not allow them to question beekeeping knowledge and practices or understand the reasons why beekeepers prefer one treatment to another. This is why for several years now, they have been relying on social scientists as experts who, unlike them, specialize in describing and analyzing human activities.

In this article, we shall explore a specific aspect of the exchanges between scientists and beekeepers, that is, how difficult it is for knowledge to circulate between these two main types of social actor. What happens when knowledge does not circulate? Why is its circulation blocked and why does it not reach its target public, that is, beekeepers? Is it because the target public rejects it or because the biologists refuse any criticism of their work?

Our thinking is based on empirical material collected within the context of our participation in various inter-disciplinary projects over a three-year period. In this article, we shall focus above all on the results of surveys carried out as part of the “Innov’Api” project (INTERREG ALCOTRA 2017-2020) financed by the European Union and bringing together biologists, technicians, beekeepers and us, that is, social science researchers.

**1.3 Convincing or Understanding**

We have decided to focus on this project because the biologists’ request for our services is unusual from a scientific point of view. It also tells us a lot about the circulation of knowledge and the challenges relating to knowledge. We were asked to help the biologists to *convince* the beekeepers to change their practices, that is, abandon their use of conventional chemical treatments to rid hives of the Varroa mite and adopt chemical-free biotechnical methods, hence moving them toward organic beekeeping. In France, there are several official organic beekeeping labels but the main one, which will be discussed in this paper, is the European one (AB).

In this research project, the method proposed by the biologists and technicians consists in removing the brood from the hives or scraping it to uncap the cells so that the larvae die. More specifically, we were asked to identify the *acceptability obstacles* preventing French beekeepers in the Alcotra area (Alpes de Haute-Provence, Alpes Maritime and Hautes Alpes) from removing the brood. Indeed, although presented as a sustainable, low-cost method for managing bee colony health, the beekeepers in the Provence and French Alps region often refuse to remove or uncap the brood cells without the biologists understanding why. We reformulated this request from the point of view of the anthropology of knowledge and sought to *understand* why and how some beekeepers have been convinced to change their practices and adopt the biotechnical innovations while others have not.

1. **Material and Methods**

In order to achieve our objectives, we needed a scientific approach for collecting (or producing) qualitative data. Furthermore, since we could not foresee exactly what the beekeepers might say to us and what we might see, we had to adapt our questions and observations over the course of the survey work. Social anthropology requires such adaptability, which is why it was appropriate for this project.

The anthropological approach was deployed in two phases. During the first phase, a large series of interviews with professional beekeepers (thirty-five in all) was conducted in Provence. These professional beekeepers were chosen with reference to the respective Association for the Development of Beekeeping (ADA) for the region but also in relation to other networks. The interviews made it possible to draw up a socio-demographic profile based on different criteria such as age, family social category, size and age of beekeeping business, business history, and so on. In this way we were able to gather sociological and anthropological information giving us a broader view and understanding of beekeepers’ access to scientific culture, advice provided by technicians or other beekeepers, and professional literature, all with respect to Varroa control.

This anthropological fieldwork allowed us to choose a smaller sample of professional beekeepers for the second phase of our enquiry. This consisted in changing the scale of our observations and so we chose six companies to work with. We worked only with professional beekeepers because this corresponded to the focus pf the scientists and technicians involved in our projects. Indeed, they consider that the problems facing amateur beekeepers are too different from those of professionals.

This phase lasted the entire 2018 beekeeping season (from March to September). The fieldwork carried out during this phase involved ethnographic inquiries in the six beekeeping companies.

The beekeepers were met regularly over the course of the season so that we could interview them on their bee colony care practices. The interviews reflected several issues such as bee colony preparation, livestock management activities, genetics, colony renewal, the season-long survey, the organization of transhumance and preparation for wintering. The beekeepers’ upstream practices were explored (what they read and the training or meetings they attended), together with their downstream practices (how they recorded and monitored their treatment of the Varroa mite in order to build up their experience from one year to the next).

We explored how their experience impacted their strategies for the coming years. For instance, we asked them questions about equal care and treatment of all their apiaries. We also asked them about the financial cost and time spent on treatments over the previous twenty years. We asked them to describe their satisfaction or dissatisfaction limits regarding treatments and when and why they changed their care strategy.

In addition, we were continuously present at the beekeeping companies during two key periods: when the beekeepers prepared their colonies before the first honey flows in the spring and at the end of summer after the last flowering. We recorded all their technical skills and the actions they undertook as part of their beekeeping activities (bee colony preparation, livestock management, genetics, colony renewal, treatments against the Varroa mite, preparation for wintering). The beekeepers were asked to explain why they opted for one or other treatment against the Varroa mite. Questions relating to bee transhumance and to when and where the beekeepers located their apiaries during the season were also put to them. The beekeepers’ comments about Varroa load were recorded. The information gathered from these interviews was then reviewed and compared with the observations. The investigation also involved counting specimens and drawing up inventories, maps, and lists.

It was also important to explore French professional beekeeping literature. The bibliography compiled took us back to the 1980s when the Varroa mite first appeared in France. The history of knowledge relating to the Varroa mite was found correspond to the official advice given to beekeepers since the parasite’s appearance.

At this point, however, it is important to emphasize that some of the most original and significant methodological features of this project were its collective and multi-disciplinary dimensions. Social science researchers usually work alone. They collect data alone, keep their data to themselves, and write papers or books in their own names. In this project, we adopted a radically different approach. This consisted in putting together and sharing all the data collected by the biologists, statisticians, and anthropologists.

The project also involved the preparation of a Master’s dissertation in anthropology by Laure Longchamps presented in June 2018 at the university of Aix-Marseilles (Longchamps 2018). Finally, roughly ten meetings were organized and recorded: technical and feedback workshops were run by the ADAPI association for the development of beekeeping in Provence, and Innov’Api Project Steering Committee meetings were held. The obstacles preventing French beekeepers in the Alcotra area from acting on the brood in order to fight against the Varroa mite shall be presented in the following paragraphs.

1. **Results**

When interacting in research projects like the ones we participated in, scientists and beekeepers neither share in the same time scales nor the same social worlds. Scientists, including us, that is social scientists, are interested in beekeepers and their practices in order to produce knowledge (biological or anthropological), which requires following academic disciplinary procedures. In short, our ultimate and central objective is to write articles and publish them in scientific journals. The ultimate and central objective of beekeepers is to manage their bee colonies in order to be able to produce honey.

To produce publishable scientific knowledge, biologists take different kinds of measurements that are then processed and compiled in databases before being transformed inti box plots, that is, graphic representations of statistical series. To produce honey, beekeepers have to manage their bee colonies as well as possible by taking into account a multitude of data. These data make sense to the beekeepers but not to the scientists, as we will see now.

**3.1 Obstacles Relating to the Effectiveness of Conventional Treatments**

The effectiveness of conventional chemical treatments commonly used by French beekeepers, especially Apivar[[8]](#footnote-8), proved to be the main technical obstacle put forward by the beekeepers. They claim to be satisfied with the results obtained and find it very effective. When the beekeepers add an oxalic acid winter treatment to Apivar, they feel they are “covered” and hence enjoy peace of mind. They also underline the simplicity and rapidity of using the Apivar strips. It takes very little time to place the strips in each hive and the operation does not require covering the face and body. The treatment is odorless, painless, and invisible: the residual chemical substances cannot be perceived by the human senses and so the product is seen to be harmless for both the beekeeper and the colonies. The only biological problem related to the use of Apivar touched upon in certain magazines and web forums is the apparent resistance of some Varroa mites to this product. However, as already mentioned, this resistance has not yet been scientifically proven. Of course, for some beekeepers, it is politically and ethically impossible for them to put chemical products, that is, insecticides, in their hives!

The treatment does not disturb the colonies. Finally, it only costs around 2 euro to treat each hive and the product is partly subsidized by French bee health defense groups. Thus, the effectiveness, simplicity, rapidity, and moderate cost of current Apivar treatments is clearly the main obstacle to accepting a change in practice.

These reasons are all the more poignant given that beekeepers in the Provence-South region have to face numerous uncertainties, notably weather-related (drought) and environmental (presence of pesticides). A reliable health treatment is reassuring for them given the extent of uncertainty. Under these conditions, it might be considered that the beekeepers refusing to change their practices have a very rational attitude: why run the risk of changing their practice when the one they use is already fully satisfactory?

When you have to juggle between the place where you hibernate, your practices as a beekeeper, the genetics of your bees, there are so many parameters in beekeeping that you can’t experiment with a treatment and be sure to get the same results, except with Apivar! Wherever you are, whatever kind of beekeeper you are, whatever the bees you’ve got, you use Apivar. It’s extremely reliable and easy to use! It ticks all the boxes. While us, with our [organic] treatments, which depend on hygrometry, temperature, place, bee, genetics, the beekeeper, etc., we’re going to get different results owing to the amount of parameters –– it’s unmanageable. (Bernard, a sixty-year old organic beekeeper)

**3.2 Obstacles Linked to the Technique Used to Remove/Scrape and Uncap the Brood Cells**

The biotechnical innovations proposed by the biologists and technicians promoting the idea of removing the brood and scraping-uncapping the cells present several drawbacks according to the beekeepers interviewed: additional treatment time is required and the bee farm work has to be reorganized. But even more problematic is the fact that the scraping or removal of the brood must be done at the end of the bee season, in August, which is when beekeepers aspire to some rest. The month of August is usually the best time for a family holiday and some quite simply prefer to give their family the priority.

Furthermore, the techniques suggested are qualified as intrusive as they target the very core of the brood; they are dangerous for the queens, who may be killed or damaged. They also require a lot of handling operations. They entail risks since the conditions, notably meteorological, may not be favorable for laying new eggs. Hence, these techniques generate *uncertainty*. Removing the brood requires buying many additional boxes to place them in, hence involving additional costs, more handling operations, and changing the breeding schedule by obliging the bees to produce a new colony at an unusual time of the year.

So I really liked the idea of removing the brood even if it’s hard-going on the apiary. And so that’s why switching from Apivar to alternative treatment methods requires more than just doubling the amount of work involved! Using Apivar is simply a question of placing two strips in the hive and then you close everything up and that’s that! Removing the brood, on the other hand, means carrying out a lot of operations on the hive and that’s a lot more intrusive since you’re actually in the brood and you don’t know where the queen is, she can be damaged, destroyed, you don’t know whether you’re going to have the right conditions to start a new brood, etc. It’s a bit like starting from scratch. (Thomas, beekeeper)

Scraping and uncapping the brood cells in order to kill the brood is not well perceived by beekeepers. They see it as harmful since it involves killing the heart of the colony, which is not an easy operation for them to carry out. Their reluctance to destroy the brood stems from moral grounds, too. Even if the brood is ill, beekeepers sometimes prefer to try and treat it rather than eliminate it. This raises very interesting questions about animal care, health, and well-being. For some beekeepers, taking care of their colonies may involve killing a brood that is ill. For others, such an operation is unthinkable. This practice is considered as objectively problematic from an environmental point of view since it is not a certified organic beekeeping practice.

**3.3 Risk-taking as an Obstacle to Changing Techniques**

Adopting these new techniques (removal/scraping and uncapping) entails *risk-taking* for the beekeepers as they enter a world full of even greater uncertainty than that offered by Apivar treatment. It must be underlined that beekeepers are already constantly faced with risks. They work in highly uncertain meteorological and environmental conditions over which they never have full control. They have no control over the amount of pesticides used on crops. They have no control over future weather and its effects on the flowering they would like their colonies to benefit from. At best they can only respond in the least harmful way possible by preparing their colonies for the specificities of each flowering and by making judicious transhumance choices. They refuse to add another parameter of uncertainty to their work equation. To date, Apivar is the most reassuring technique, providing the best guarantee in a world full of unexpected occurrences. Their strategy is based on minimizing risks (Eldin, Milleville 1989; Chateauraynaud, Torny 1999; Mormont 2015). They do not seek to maximize their gains but to ensure they have a safe, if not necessarily high, income.

**3.4 Obstacles Relating to Private Life**

Beekeepers are also human beings, with a personal life, family, leisure activities, and their own psychology. They have tastes and preferences. They make choices, and so on. The different obstacles to treating the Varroa mite by brood removal linked to their private life can be divided up into different categories: their subjective and objective relationship to the time they spend working and the time they spend with their family.

Beekeepers’ relationship to the time they spend working is subjective and changes over the course of their life. In fact, it is more appropriate to talk about their availability for beekeeping work. This availability evolves over time and according to changes in their personal and family life. Young single beekeepers with no children would seem to have the most availability and therefore be more likely to spend time on their hives. But they may also prefer to do something else, such as playing golf or sailing. While, objectively, they may have a lot of free time they do not necessarily spend all of it on the upkeep of their colonies. On the other hand, beekeepers with children, whether they are single or with partners, have less availability for their hives. However, some may prefer to be with their bees rather than with their family. The psychological dimension of this subjective relationship to work and family must not be forgotten. Depending on the legal status of their bee farm (a company operated under the beekeeper’s own name, an individual structure or a collective structure such as a GAEC collective farming group), and their age, it may or may not be possible to modify the way tasks are shared out and spend more time on health treatments.

Although everything depends on each individual case, there are a number of dominant trends:

- The beekeeper’s economic situation (other household income, loans to be reimbursed, personal and family assets and wealth) is a determining factor with respect to a change in colony treatment methods. Older beekeepers whose children are no longer dependent on them or who no longer have any loans to pay off may be more open and receptive to a change in techniques since they have less to lose. They would be taking fewer risks than younger beekeepers with dependent children and loans to reimburse. Such younger beekeepers may therefore be more resistant to a change in technique, especially if their spouse does not have a stable income. If their spouse does have a stable income, beekeepers may be more likely to take risks and hence opt to go down the more time-consuming and uncertain organic beekeeping path.

- The beekeeper’s tastes and preferences: some beekeepers like to try out and experiment with new practices while others do not. These tastes and preferences are part of their personal history and stem from their personal and professional lives before they became beekeepers. If the beekeeper is single and childless, different cases may apply: either they opt to take risks and make a considerable investment in their apiary work, or they adopt a more cautious attitude. Over the course of their professional careers, those who enjoy trying out new things and experimenting with their apiaries may test different health treatment techniques (and other practices), even without the help of technicians. Their bee farm is never stable or fixed. These beekeepers seek performance and regularly modify the genetics of their bees, their transhumance routes, commercialization channels, and health treatments.

- Other beekeepers, on the contrary, have a long-stabilized farming system that suits them and which they do not wish to modify. These different attitudes are partly linked to what the beekeepers did before they converted to this activity.[[9]](#footnote-9) Our survey shows that beekeepers having studied and who have a Master’s in agronomy, geography, ecology, or another discipline are more inclined to experiment and take part in the *participatory field sciences* proposed by the technicians from the beekeeping development associations in their respective regions together with the INRA biologists working alongside them.

In summary, beekeepers’ family and economic situations, as well as the career paths they have followed, play a crucial role in their acceptance or their reluctance to the idea of brood removal.

**3.5 Economic and Environmental Obstacles**

Focused on the lavender honey flow and ending in August the bee season in the Provence-South region does not allow, or at least does not provide, favorable conditions for beekeepers to switch to the technique of removing the brood as they do in Italy. In Italy, removing the brood in July allows beekeepers to create new swarms at a profitable time of the year for their resale: 60,000 euro for the sale of 500 small hives (according to the Italian vet involved in the Innov’Api project). This appears to be a stable and guaranteed income affording the beekeepers a very welcome annual supplement. When the time comes, broods can be removed from their hive and put into smaller ones where they will become new swarms. These can then be sold to beekeepers keen to increase their livestock. In France, in the Provence-South region, removing the brood does not generate money directly as it is not the best season for reselling the swarms produced. This is because the operation is performed at the end of the beekeeping season (mid-August) when the lavender honey flow has stopped, and the queen no longer lays any eggs owing to the lack of protein in the lavender flowers.

Indirectly, of course, removing the brood does improve colony health and productivity. However, the gains are indirect and uncertain, and there is no reason for beekeepers to abandon the advantages they already have. Indeed, beekeepers in Provence have no difficulty selling their honey, even as bulk to wholesale merchants. The conventional price of honey in the region is high, especially for lavender honey, which is what is mainly produced. Scraping or removing the brood would allow the beekeepers to become organic producers, which is more lucrative, but the price of bulk organic honey (around 3 euro/kilo) is not attractive enough to constitute a decisive argument.

**3.6 Political Obstacles**

According to what is generally said today, current public policies are not encouraging beekeepers to adopt more environmentally friendly techniques (Rumpala 2011; Lamine 2017). On the contrary, they are complicating the switch to organic beekeeping by obliging beekeepers to pay for organic labeling. This belies the polluter pays principle, which should on the contrary make conventional beekeepers pay rather than those switching to organic methods. According to current policies, beekeepers are obliged to change their waxes every two or three years (which is absurd given that the waxes have time to contaminate each other), and, above all, they are encouraged to renew their bee population thanks to attractive state subsidies. The State’s implicit message is thus as follows: *don’t bother taking care of your colonies; we’ll help you to renew them.* Public aid and subsidy policies give money to GDSA local bee health defense groups so that they can sell Apivar strips to beekeepers very cheaply. This financial support thus appears to act as a political incentive to continue using chemical treatments.

Finally, in the specifications for organic beekeeping, scraping the brood cells is neither expressly authorized nor forbidden. So, legally it is unclear whether this technique should be used to obtain an organic beekeeping label. As for other livestock, the organic standards for beekeeping cover the food they eat, their living conditions, health care and other management practices. And there are several official organizations that can certify whether the honey produced is organic or not. With respect to this organic label, beekeepers in the Provence region are currently facing a threat that is undermining any wish they may have to make their bee farms greener and placing the problem of health treatments in the shadows. Discussions are underway at the French National Institute for Origin and Quality (INAO), the body in charge of drawing up organic beekeeping specifications, to explore the possibility of putting an end to the current waiver regarding organic lavender honey flow. As the main floral resource in the region, or at least the most lucrative, lavender growing is considered to use a lot of pesticides (notably herbicides). This practice cannot be reconciled with an organic label. If lavender honey were to be removed from the catalogue of organic honeys, then beekeepers in this region, whose lavender honey represents the biggest share of their turnover, would have no reason to prefer an environmentally-friendly form of Varroa mite management with the aim of switching to organic bee farming techniques.

**4. Conclusion: Beekeepers’ Relationship to Scientific Knowledge and Scientists’ Relationship to Beekeepers’ Knowledge**

Identifying the different reasons why most beekeepers in the Provence-South region refuse to adopt the brood removal/scraping technique to control Varroa mite infestations in their bee colonies has shed much light on the lack of understanding between beekeepers and scientists. Beekeepers refuse the recommended technique since subjectively it is of no interest to them, even if the biologists objectively present it as a future beekeeping solution.

Placing the beekeepers’ subjectivity at the center of our questioning, our study pinpoints the gap between biologists’ expectations and beekeepers’ expectations. While the biologists base their reasoning on an ideal world, which is decontextualized, depersonalized, and atemporal, the beekeepers must consider the reality of their everyday lives. With respect to health questions, it is now easier to understand the beekeepers’ ambivalent attitude towards scientific knowledge. While the beekeepers have respect for and lend credit to the biologists’ knowledge, they consider that the results cannot always be used by professional beekeepers whose living comes from selling the product of their hives. On the other hand, when the scientific results afford technical and health-related improvements, the beekeepers are very much for them. Our survey also revealed misunderstandings and disappointments with respect to the transmission and formalization of bee colony health knowledge and Varroa mite infestation rates: the scientists and technicians manufacture tools (e.g. box plots) to formally present the measurements carried out on the apiaries. They then send these formalized results to the beekeepers and try to explain to them what the box plots mean. However, this schematic representation of reality can be difficult to grasp. The way the results are presented is not always easy for the beekeepers to understand and hence fails to enlighten them. Many beekeepers say they prefer to use everyday language to talk with the technicians and scientists about the results of their measurements rather than read tables and diagrams that they find boring and abstruse, especially if they have no scientific background. Many beekeepers readily give credit to the knowledge of scientists and technicians who are themselves beekeepers. This dual role, at once empirical and theoretical, lends greater weight and authority to their knowledge than to that produced by scientists with little field experience. In this case, the dialogue between biologists and beekeepers is based on the interpersonal relationship created.

There is also the relationship of the beekeepers to social science knowledge. To begin with, they are wary, afraid that they will be psychoanalyzed or manipulated. They believe that the know-how and related publications will not help them to solve their problems. At the same time, they also find that the questions we put to them and the discussions raised shed light on the way they go about their profession. Similarly, the technicians’ and scientists’ relationship to the beekeepers’ knowledge is also ambivalent: they qualify this knowledge as *beliefs* and *gut* *feelings*, which they contrast with a reality that only scientists are able to capture and reveal thanks to their protocols, methods, and procedures for building knowledge and managing evidence. As social science researchers, we see that what the biologists deem to be *beliefs* and *gut feelings* are know-how and knowledge stemming from the individual and shared experience of the beekeepers. Although they discredit knowledge that is not produced by Science, disqualifying it using the above-mentioned terms, the scientists nevertheless acknowledge that the beekeepers do have solid and reliable beekeeping knowledge.

Although knowledge circulates, its circulation is sometimes hindered. If our social science approach is able to improve the mutual understanding of the different actors belonging to this same social world (Faugère 2019; Callon 1999), it is to be supported. Our role has been to translate what is implicit in the situation for those involved. The main point is that in order to convince the beekeepers in the South of France to abandon their chemical treatments and adopt population-based methods instead, the biologists and technicians supporting them must continue to refine their arguments.

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1. INRAE, Ecodéveloppement, Avignon, France [↑](#footnote-ref-1)
2. CNRS, Centre Norbert Elias, Marseille, France [↑](#footnote-ref-2)
3. Since there are also women professional beekeepers, it would seem right to adopt an inclusive style for the French version of this article and use both the feminine and masculine noun for the word beekeeper. However, given that the majority of professional beekeepers are men and that adopting an inclusive style of writing can make reading more difficult, we shall use the masculine form of beekeeper as the gender neutral term applying to both men and women (Translator’s note: in French “apiculteur” is the masculine noun for beekeeper and “apicultrice” is the feminine noun). [↑](#footnote-ref-3)
4. Joan Martinez Alier (1987) and Robert Costanza (1991) are considered as two of the main founders of this new field of research. [↑](#footnote-ref-4)
5. In 2017, in an effort to federate and lend visibility to all this contemporary social science research on bees and beekeeping in France, and working together with researchers from the INRA, CNRS and MNHN, we created a bees and societies network called “réseau Abeilles et Sociétés”: <<http://www.sad.inra.fr/Recherches/Abeilles-et-Societes>>. [↑](#footnote-ref-5)
6. With respect to the fear generated by scientific technologization see Bernadette Bensaude-Vincent (2004) and Isabelle Stengers (1995, 2002). [↑](#footnote-ref-6)
7. A brood is all of the bees waiting to be born. They may be in the form of eggs, larvae and pupae. They are protected, cared for and fed by worker bees. The Varroa egg is laid in a cell by a founding female who enters the cell just before it is capped and stays there. Young Varroa females are impregnated by their brothers and leave the cell when the bee is “born.” [↑](#footnote-ref-7)
8. Apivar is the commercial name of the main chemical treatment used by French beekeepers since the 1990s. Another product is Apitraz. Both are composed of amitraz. This chemical molecule has replaced fluvalinate, which was the insecticide used until the end of the 1990s when resistance to it began to emerge. [↑](#footnote-ref-8)
9. Our surveys reveal a socio-demographic profile marked by a change in profession, that is, with the beekeepers having had a previous job before turning to this activity, and by a high level of qualification. Most beekeepers met are graduates holding either a Bachelor’s or Master’s degree (between three and five years of higher education). [↑](#footnote-ref-9)