



Economic value of the pollinating service provided by bees in Switzerland

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Short title: Valuation of pollination spurs support for bee keepers, Switzerland

Key Message: The economic value of pollination by bee colonies is much higher than the one resulting from the direct products of beekeeping (honey, pollen, beeswax, etc.) in Switzerland. Large economic and ecological damages might occur in Switzerland if the trend of decreasing numbers of beekeepers and their colonies continues.

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What is the problem? What is the link to local policy?

In Switzerland, beekeeping is mainly a hobby which is of high importance for the country's plant diversity and agricultural production. However, beekeepers are generally not rewarded for the services that they provide. The number of beekeepers and bee colonies have strongly decreased since their highest levels (about 350,000 colonies), which was before and during World War II (Fluri and Fricke 2005). In 2007 there were about 170,000 colonies and about 19,500 beekeepers left (BLW 2008).

Today, the average density of the bee population in Switzerland is considered to be adequate enough to still assure a sufficient pollination of cultivated and wild plants. However, there are regions which have been hit hard by mass mortalities of bees in the last few years. In such areas, bee populations have already reached a critical mass. For example, in the winter of 2006/2007 about 31,000 colonies were lost in the administrative area of one of the three Swiss beekeeper associations (BWL 2008). This shows that an adequate distribution of the colonies is crucial (Fluri and Fricke 2005). A general appreciation of beekeeping in Switzerland through the support of bee research and beekeepers' education, as well as financial support, could help make beekeeping in Switzerland more attractive.

Which ecosystem services were considered and how?

Fluri and Fricke (2005) focussed their research on the provision of the bees' services for Swiss agriculture; namely the pollination of cultivated plants. To understand the importance of bees for the Swiss agricultural production, the authors estimated the economic value of the pollinating service provided by Swiss bees: They looked at the value of the total harvest of Swiss fruits and berries, which rely on insect pollination (after Robinson et al. 1989). To this total, insect pollination bees are estimated to contribute a fraction of about 80%¹. This approach only considers those pollinating services directly relevant for agricultural production – other values, such as the pollination of non or partly entomophilous cultures,

¹ The results were updated by BWL 2008.

wild plants and the maintenance of wild plant diversity (and of entire ecosystems), were not considered for lack of an easy-to-find market price (Fluri and Fricke 2005).

On average, Swiss bee colonies ensured a yearly agricultural production worth about 256 million CHF (213 million US\$)², by providing pollination in the time from 1997 to 2006. Remarkably, this 'hobby' generates an economic value that is five times the value generated from the production of honey, which is approx 60 million CHF (about 50 million US\$) (BWL 2008). Downscaled to one single colony, this would be an estimated production worth 1,260 CHF (1,050 US\$) in pollinated fruits and berries and only 258 CHF (215 US\$) for direct products from beekeeping (e.g. honey, beeswax, pollen) (Fluri and Fricke 2005). Local environmental policy has therefore good reason to take care of bees and other pollinating insects.

What policy instrument builds upon this ecosystem service information?

After several years of honey bee mass mortalities in Switzerland and all over the world (Charrière and Neumann 2010; Neumann and Carreck 2010), the results of the valuation study by Fluri and Fricke (2005) attracted official attention. The value of bees and their pollination service became evident and policy makers reacted with the formulation of a concept to promote bees and beekeepers in Switzerland (BLW 2008). On the one hand, this concept provides funds for an extension of the research on bees, while on the other hand financial support is ensured to facilitate a professional sector organisation (bee health service, support for breeding and education). The total annual support from the federal government mounted up to 1.2 million CHF (about 1 million US\$) in 2008, however the concept advises that this funding be increased (BWL 2008).

Furthermore, the researchers of the Swiss bee research centre at Agroscope Liebefeld-Posieux (ALP), were involved with an application for a European Cooperation in Science and Technology (COST) Action, to counteract the bee colony loss phenomena (Action FA0803: Prevention of honeybee Colony Losses – COLOSS) (Gallmann 2010). This joint action became operative in 2008 and is funded with approx 400,000 € (550,000 US\$)³ over a period of four years by the participating parties. Members from 42 countries are working closely together (Charrière 2010). The action will expire in 2012, and the research focus is concentrated on the investigation of causes for mass colony losses, the development of emergency measures as well as sustainable management strategies to prevent future losses (COST 2008).

Additionally, single cantons also developed concepts to support beekeepers in their territory. Since 2008 the Canton of Fribourg, for example, financially supports the beekeeping sector. Each newly recruited beekeeper, who owns at least five colonies, is subsidized with 1,500 CHF (1,250 US\$) in total over a period of three years if he complies with certain terms. The funds are given in three parts and are gradually decreasing in the amount (VFB 2008). In several single Swiss municipalities, like Mönthal or Niederrohrdorf in the Canton of Aargau, pollination bonuses are given to beekeepers ranging from 10 to 50 CHF (8 to 42 US\$) per colony and per year (Municipality Niederrohrdorf 2009; Seer 2010).

References:

² All values were converted from Swiss Franc with the average exchange rate of 2007 (1 CHF = 0.8327 US\$), <http://data.newyorkfed.org/markets/fxrates/historical/home.cfm>.

³ All values were converted from EURO with the average exchange rate of 2007 (1 €= 1,3704 US\$), <http://data.newyorkfed.org/markets/fxrates/historical/home.cfm>

Bundesamt für Landwirtschaft (BWL) (2008). Konzept für die Bienenförderung in der Schweiz. <http://www.blw.admin.ch/dokumentation/00018/00201/index.html?lang=de> (last access March 26 2010).

Charrière, J.-D. and P. Neumann (2010). Surveys to estimate winter losses in Switzerland. In: Journal of Apicultural Research, **49** (1), 132-133, DOI: 10.3896/IBRA.1.49.1.29.

Charrière, J.-D. (2010). Personal communication (April 13 2010).

COST Office (2008). Action FA0803 Fact Sheet. http://w3.cost.esf.org/index.php?id=181&action_number=FA0803 (last access March 26 2010).

Fluri, P. and R. Frick (2005). L'apiculture en Suisse: état et perspectives. In: Revue suisse d'agriculture, **37** (2), 81-86.

Gallman, P.U. (2010). Personal communication (March 25 2010).

Municipality Niederrohrdorf (2009). Personal communication (April 1 2010).

Neumann, P. and N.L. Carreck (2010). Honey bee colony losses. In: Journal of Apicultural Research, **49** (1), 1-6, DOI 10.3896/IBRA.1.49.1.01

Robinson W.S., R. Nowogrodski and R.A. Morse (1989). The value of honey bees as pollinators of U.S. crops, Part II. American Bee Journal, **129**, 477-487.

Seer, Thomas (2010): Personal communication (April 1 2010).

Verband Freiburger Bienenzüchter (VFB) (2008). Antragsformular für die Starthilfe bei Neukernen. <http://www.ffa-vfb.ch/documents/Fragebogen.pdf> (last access March 26 2010).

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