

# MARKETING APPROACH IN ROLE AND IMPORTANCE OF POLLINATORS IN GARDENS: A PRELIMINARY STUDY

Peter Šedík<sup>1</sup>, Elena Horská<sup>2</sup>, Andrzej Krasnodębski<sup>3</sup>, Monika Bieniasz<sup>4</sup>

Slovak University of Agriculture in Nitra<sup>1,2</sup>

Faculty of Economics and Management

Department of Marketing and Trade

Tr. A. Hlinku 2

Nitra, Slovakia

e-mail<sup>1,2</sup>: sedik.peter@gmail.com, elena.horska@gmail.com

University of Agriculture in Krakow<sup>3</sup>

Faculty of Agriculture and Economics

Institute of Economics and Enterprises Management

Department of Economics and Corporate Finance

Al. Mickiewicza 21,31-120 Krakow, Poland

e-mail<sup>3</sup>: rkrasno@cyf-kr.edu.pl

University of Agriculture in Krakow<sup>4</sup>

Faculty of Biotechnology and Horticulture

Institute of Plant Biology and Biotechnology

Department of Pomology and Apiculture

Al. Mickiewicza 21,31-120 Krakow, Poland

e-mail<sup>4</sup>: monika@ogr.ur.krakow.pl

## Abstract

*The population of pollinators is decreasing despite their importance in agriculture and ecosystem. The purpose of this paper is to evaluate the situation of pollinators, including honey bees in gardens and close surrounding of selected regions in Slovakia and Poland. Primary data were obtained via questionnaire survey focused on respondents with gardens. The questionnaire was distributed online via emails and social media during July – November 2017. Respondents evaluated the population of pollinators, importance, and biodiversity using scaling method. Descriptive statistics and Mann-Whitney test were applied for data analyses. Based on results from both countries, the majority of respondents regularly observe pollinators in their gardens where the most frequent pollinators are bees and bumblebees. Nearly all respondents are aware of their role in increasing yields in gardens and consider pollinators very*

*important. Overall, the respondents are aware of the threat from pesticides used in intensive agriculture and perceive population of pollinators as insufficient in their gardens. However, the majority of them do not build natural shelters in their gardens. In Slovakia, most respondents usually grow bee friendly plants near orchards and vegetable gardens in order to attract pollinators, while in Poland the majority of respondents grow bee friendly plants unintentionally and not near orchards and vegetable gardens. In conclusion, people should be educated about the importance of pollinators in ecosystem and their essential role in gardens and agriculture. The most adequate teachers should be beekeepers who are familiar with this issue, and by using proper marketing communication it could create an important platform for their promotion in society.*

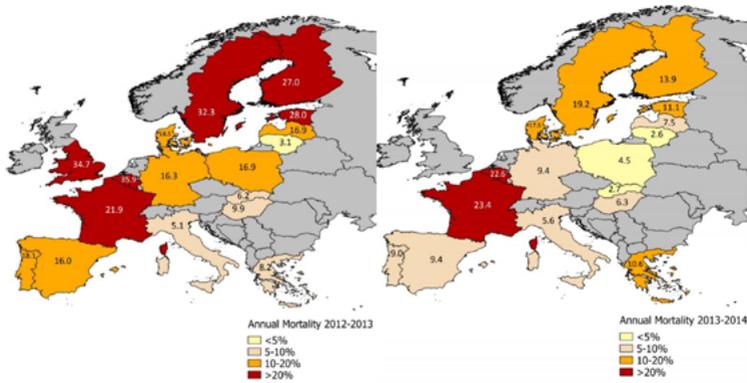
**Keywords:** *marketing communication, Poland, pollinators, gardens, Slovakia,*

**JEL Classification:** *M31, Q13, Q57*

## **1 Introduction**

The world ecosystem depends on pollinators including native bees, honey bees (*Apis Melifera*) and other insects as they are essential in production of many crops by providing pollination service. In general, bees pollinate vegetables, agricultural crops, flowers and wild flowers. By doing this process, they maintain ecosystem and secure proper environmental conditions for farmers and the whole agriculture (Eilers et al., 2011; Klein et al., 2006; Delaplane & Mayer, 2000). In recent years, the population of pollinators has significantly decreased. Many studies reported a certain decline in number of pollinators connected with decreased yields of agricultural crops (Aizen & Harder, 2009; Carvell, Meek, Pywell, Goulson & Nowakowski, 2007). Neither of the honeybee colonies were spared from high mortalities in the USA, Europe and Asia (Li et al., 2012; Lee et al., 2015; van der Zee et al., 2014). The sudden decline of pollinators has arisen many concerns about pollinators and diversity crisis and problems (Tylianakis, 2013; Jacques et al., 2017). In winter 2012/2013, (see Figure 1) many European countries experienced high mortality rate of honeybee not excluding Poland (14.8 %) and Slovakia (6.2 %). The highest mortality was recorded in Belgium (35.9 %), United Kingdom (34.7 %), Sweden (32.3 %), Estonia (28 %), Finland (27 %) and France (21.9 %). In the following winter, the annual mortality rate improved in both Poland and Slovakia (<5 %).

Figure 1 Honey bee mortality in winter 2012/2013 and 2013/2014



Source: Laurent, Hendriks, Ribiere-Chabert, & Chauzat, 2016.

Overwintering mortality rate is influenced by climate, however, it depends on other risk factors involving environment, diseases, veterinary treatment, colony management and colony health (Laurent, Hendriks, Ribiere-Chabert & Chauzat, 2016). The overall decline in the population of pollinators is connected with habitat loss, (M'Gonigle, Williams, Lonsdorf & Kremen, 2017), intensive farming, increasing amount of pesticides used in crops production (Silvina et al., 2017), decreasing biodiversity and availability of flowers in environment (Bukovinszky et al., 2017).

Current situation highlights the need for sustainable farming methods and application of integrated crop pollination, which will ensure stable pollination service. (Isaacs et al., 2017). Several studies propose to plant bee-friendly plants situated in field margins which will provide more feed and better habitat for various pollinators. Field margins will attract pollinators by the rich offer of nectar and pollen and sustain crop pollination (Kirmer, Rydgren, Tischew, 2018; Menz et al., 2010). The gardens also play an essential role in providing natural habitat for bees and other pollinators. Therefore, public interest and global awareness may lead to improvements by increasing biodiversity in private gardens with great contribution to ecosystems (Samnegård, Persson & Smith, 2011). Furthermore, public awareness leads to positive human engagement which is important for sustaining the population of pollinators and increasing biodiversity in gardens (Bhattacharya, Acharya & Chakraborty, 2017).

The main contribution of this paper is to evaluate and study the situation of pollinators, including honey bees in gardens and close surrounding of selected regions in Slovakia and Poland. Research will be aimed at the current state of

diversity, number of pollinators, conditions in gardens and awareness of their importance and role in pollination services among gardeners.

## 2 Data and Methods

The study was based on primary data obtained by conducting online questionnaire survey in selected regions of Slovakia and Poland. Questionnaires in Google form were distributed via emails and social media, but predominantly via Facebook groups devoted to gardening, gardens, fruits and vegetables, flowers, horticulture, farming and nature. The survey, which lasted from July to November 2017, reached 288 respondents in the Nitra region in Slovakia and 214 respondents in Małopolska Voivodeship in Poland.

The main criteria for research sample selection were land or garden in possession. The majority of respondents were hobby gardeners mostly in rural areas (77.1 % in Slovakia) while in Poland both rural (56 %) and urban (42. %) areas. The respondents were asked to evaluate the situation in their gardens and surroundings based on their observations and according to their opinion. The questionnaire included several scaling questions oriented on rating current situation of pollinators' population and biodiversity.

The data from questionnaire survey were processed and analysed in statistical program SAS Enterprise Guide 7.1. The results were analysed using descriptive statistics, and the differences between countries in scaling questions were statistically tested by Mann – Whitney U test, which is usually applied to compare the values (averages) of two independent samples. It analyses whether two independent samples are selected from a population with the same distribution.

$$d_i^- = \sqrt{\sum_{j=1}^m (z_{ij} - z_j^-)^2}, z_j^- = \min_i \{z_{ij}\}, z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j}$$

where  $R_1$  – the sum of ranks in sample with smaller sample size

$n_1$  – size of smaller sample ( $n_1 \leq n_2$ )

$n$  – total sample size ( $n = n_1 + n_2$ )

(Hudec, Sisáková, Tartalová, & Ťelinský, 2007)

Hypotheses

H1: There exist differences in evaluation of the population of pollinators between countries.

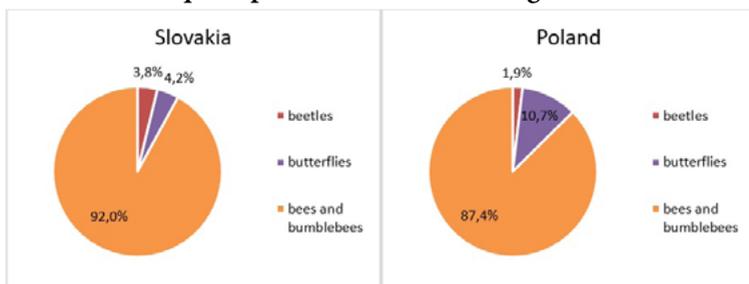
H2: There exist differences in evaluation of the importance of pollinators between countries.

H3: There exist differences in evaluation of biodiversity between countries.

### 3 Results and Discussion

According to the results, the majority of respondents in both countries observe pollinators on a regular basis (Slovakia – 67 % and Poland – 68.7 %). Approximately one third observe pollinators only sometimes (Slovakia – 33 % and Poland – 31.3 %). Gardens are generally pollinated by solitary bees, honey bees, butterflies and beetles. In both countries, the most frequent observed pollinators were bees and bumblebees (see Figure 2).

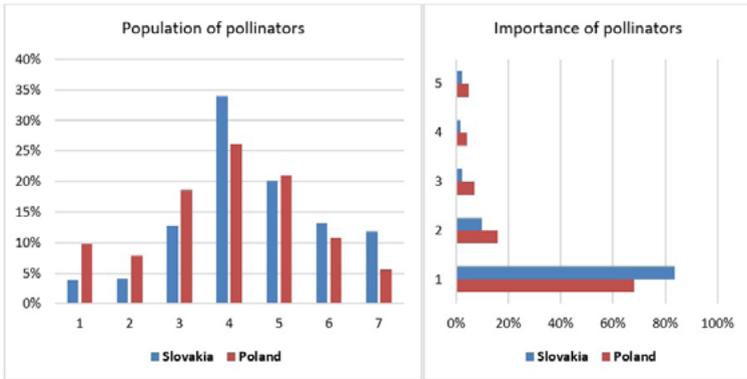
Figure 2 The most frequent pollinators observed in gardens



Source: Questionnaire survey, 2017.

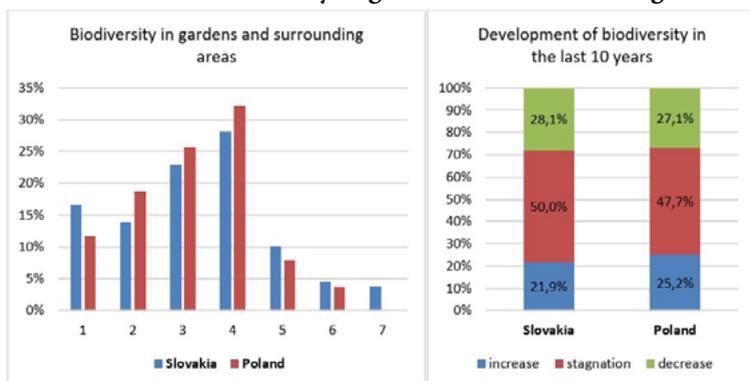
Furthermore, respondents were asked to evaluate the current situation of pollinators in their gardens using a 7-point scale, where 1 represented overpopulation while 7 represented insufficient population. Based on the respondents' observations (see Figure 3), in both countries the majority of respondents (Slovakia – 45.1 % and Poland – 37.4 %) consider the population of pollinators as insufficient. However, at the same time a similar number of Polish respondents (36.4 %) consider it as sufficient. Importance of pollinators in gardens was evaluated using 5-point scale where 1 represented very important and 5 – not at all important. Pollinators are mostly considered to be very important both in Slovakia and Poland. From statistical point of view, according to Mann-Whitney U test in both evaluations exist differences between countries (H1 and H2 were confirmed).

Figure 3 Evaluation of pollinators in gardens



Source: Questionnaire survey, 2017.

In addition, the respondents were asked, whether they know about the current situation which is critical due to high pollinators' mortality caused by pesticides used in intensive agriculture. In both countries, almost all of them are aware of this issue (Slovakia – 96.2 % and Poland – 94.9 %), however, most of them do not build and provide bee shelters for them (Slovakia – 87.2 % and Poland – 83.6 %). Besides focusing directly on pollinators, respondents had to observe and evaluate biodiversity as an indicator of pollinators' habitat. Biodiversity in the gardens and surrounding areas was evaluated on 7-point scale where 1 represented high biodiversity while 7 represented almost absenting biodiversity. Obtained results showed that the most frequent answer in both countries (see Figure 4) was medium biodiversity, however overall rating indicates a high level of biodiversity. Afterwards, respondents evaluated the changes of biodiversity in the last 10 years. Approximately half of respondents in both countries consider biodiversity in their gardens and surrounding area without change. The rest of respondents mostly observed a decrease. Moreover, the third hypothesis was not confirmed, and there are not any differences present in evaluations between countries.

**Figure 4 Evaluation of biodiversity in gardens and surrounding areas**


Source: Questionnaire survey, 2017.

Furthermore, the study examined whether respondents contribute to biodiversity by planting various types of bee friendly flowers. In Slovakia, the majority of them grow bee friendly plants (92.7 %), however, only one third do it intentionally with the purpose to support pollinators. Respondents mostly grow ornamental plants (46.2 %) and herbs (37.2 %) – mainly lavender (44.1 %) and mint (33 %). Despite the higher awareness of pollinators' impact on yields in gardens (95.5 %), only 57 % of them grow bee friendly plants near orchards and vegetable gardens with the intention to attract pollinators. Similar results were obtained in Poland, where the majority of respondents (79.9 %) grow bee friendly plants, out of which more than a half (53.3 %) do it without intention to help and support pollinators. The main plants grown by respondents were mostly ornamental plants (68.2 %), herbs (17.8 %) and agricultural crops (10.7%). In case of herbs, respondents prefer to plant mint (40.7 %) and lavender (34.6 %). A slightly different situation occurs in Poland, where the majority of respondents (93.9 %) are aware of the fact that pollinators increase yields in gardens, but more than 76 % of them do not grow bee friendly plants near orchards and vegetable gardens.

Similar studies focusing on consumer perception towards pollinators, bee friendly plants and pesticides indicate growing public interest in pollinators' health issues and their current threat in a form of certain pesticides. Increasing the awareness of this issue opens new market opportunities in horticulture industry to offer pesticide-free plants, seeds and bee friendly plants (Rihn, Khachatryan, Campbell, Hall, & Behe, 2016; Rihn & Khachatryan, 2016; Campbell, Khachatryan, & Rihn, 2017; Khachatryan & Rihn 2017; Khachatryan et al., 2017).

Public awareness could be increased by proper marketing communication targeted at people who own certain landscape or gardens. The fundamental tools

of marketing communication are advertising, public relations, direct marketing, personal selling, online marketing and others (Nagyová, Košičiarová & Kádeková 2014). The whole concept could be classified as a sustainable marketing where beekeepers as essential guardians of honey bees will inform and influence their customers about the current situation with pollinators by using several tools of marketing communication (Palúchová & Benda Prokeínová, 2013). In this case, the most suitable tools would be public relations where beekeepers would create a sort of storytelling connected with their beekeeping activities and presenting it as community service in a form of sustainable pollination in their surroundings (Šimo & Rovný, 2010).

Furthermore, beekeeper could increase awareness of this issue among people through personal selling, by informing and educating people. Explaining that by purchasing honey from local beekeepers they also help to sustain pollination in their surroundings and improve their situation. To increase the biodiversity, beekeepers should educate their customers which bee friendly plants should be grown. They should also explain that by improving natural habitat they support not only honeybees, but also other types of pollinators which have significant contribution to the ecosystem. Another tool which could be applied is advertising. In marketing communication, it represents strong tools for targeting a massive number of people with a purpose to inform and persuade. For instance, beekeepers' associations may use advertisement in public TV to increase the level of awareness to maximum by explaining the importance of a current situation. By applying these tools, associations could ensure better habitat not only for honeybees, but also for other pollinators, and at the same time improve quality of pasture for own bees.

## 4 Conclusion

In conclusion, the questionnaire survey showed similar results in both Slovakia and Poland:

- The majority of respondents observe pollinators in regular basis, frequently observe bees and bumblebees and consider pollinators as very important. Based on their observation, population of pollinators was mostly evaluated as insufficient. Almost all respondents were aware of the critical situation of pollinators, honeybees in particular, caused by pesticides. Nevertheless, more than two third of respondents do not provide bee shelters in their gardens.
- Furthermore, respondents evaluated biodiversity in gardens as well as surrounding, and most of them consider biodiversity as high. However, the most frequent answer was medium. In terms of development of biodiversi-

ty in the last 10 years, the half of respondents indicated stagnation followed by decreasing tendency. Almost all respondents know that presence of pollinators in gardens increases yields, and they grow bee friendly plants, mostly ornamental flowers and herbs such as mint and lavender. In spite of positive engagement of respondents, most of them do it without intention to support pollinators and do not grow bee friendly plants near orchards and vegetable gardens. Due to this fact, there is still space for improvements of the current situation through increasing public awareness by explaining the current situation with pollinators.

- Public awareness could be increased by applying the proper tools of marketing communication. Firstly, beekeepers could use personal selling and public relations as a way to inform, educate and increase awareness of this issue. They should explain the honey consumers that by buying honey from local beekeepers they support not only beekeepers, but also honeybee colonies, increase sustainable pollination and biodiversity as well as the whole ecosystem in their surroundings. Moreover, the advertisement could be used by beekeepers' association in order to reach a massive amount of people. For example, advertisement on TV could persuade people to grow more bee friendly plants in their gardens. That way people will be informed better, beekeepers will obtain better pasture for honeybees and by improving the overall diversity the situation with pollinators will improve as well.

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