APIMONDIA SCANDINAVIA 2025
SWEDEN | DENMARK | NORWAY

PP-498 [Beekeeping for Rural Development]

Increasing the Value of Beekeeping Products by pollen surveys at Indigenous tribes in Taiwan

Pen-Han Chen, Pei-Shou Hsu*
Miaoli District Agricultural Research and Extension Station, Ministry of Agriculture, Taiwan
E-mail: pshsu@mdares.gov.tw

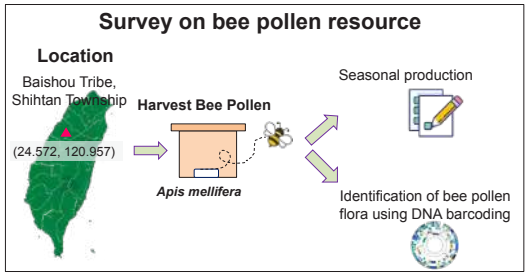
Abstract

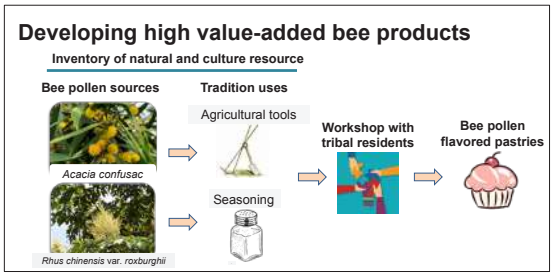
This study addresses the challenges faced by Taiwan's indigenous tribes, specifically the Saixia tribal's Baishou tribe, where a lack of rural job opportunities leads to youth outmigration and cultural erosion. We explored the potential of transforming indigenous agriculture, particularly beekeeping, to create sustainable livelihoods. While the region boasts diverse botanical resources suitable for beekeeping, an initial survey of the Baishou tribe revealed limited bee pollen production (approximately 240g from five colonies over seven hours in spring), and making direct bee pollen sales unviable. However, we identified *Bidens pilosa* var. *radiata* and *Acacia confusa* as dominant pollen sources. Leveraging traditional indigenous knowledge, we assisted local youth in developing bee pollen-flavored pastries using small quantities of *Acacia confusa* and *Rhus chinensis* var. *roxburghii* pollen. These plants hold cultural significance, traditionally used for tools, clothing, fuel, and seasoning. By integrating these cultural narratives with the new products, the pastries were successfully marketed at local tourist attractions, leading to a 21.3% increase in profit. This demonstrates that combining traditional tribal wisdom with resource surveys can significantly enhance the value of bee products and foster rural economic growth.
Keywords: Indigenous tribe, beekeeping, bee pollen, tribal wisdom, rural economic growth

Introduction

Taiwan's indigenous tribes reside in mountainous areas that serve as vital reservoirs of biological and natural resources. However, in modern society, due to factors such as terrain, water resource protection regulations, and government land management policies, rural communities in mountainous areas face significant restrictions in land use and economic development. This has led to young adults migrating to urban areas for career opportunities, posing a risk to the sustainable development of indigenous communities. To balance rural economic growth with ecological preservation, many countries are promoting forest beekeeping. Bradbear (2009) provided an extensive review of the case, pointing out the positive impact of beekeeping on forest management and conservation. They emphasized how bee pollination promotes forest ecosystems and biodiversity, while products such as honey and beeswax provide important economic income for residents in remote areas. In addition, bee pollen is a promising product in forest beekeeping. Bee pollen is a pellet of pollen mixed with bee saliva and nectar, collected by bees and brought back to the hive, serving as their primary nutritional source for growth and development (Campos et al., 2008). It's rich in carbohydrates, proteins, vitamins, and minerals. Studies suggest that bee pollen's balanced nutritional profile may help improve metabolic syndrome, reduce the risk of cardiovascular disease and diabetes, and regulate ovarian function. Additionally, bee pollen contains phytochemicals like polyphenols and flavonoids, which possess antioxidant, antibacterial, and anti-cancer properties (Cai et al., 2017; Li et al., 2018; Khalifa et al., 2021).However, introducing advanced production, processing, and quality management knowledge and operations can be challenging for small-scale producers (Contreras-Medina et al., 2025). Research by Zhou et al. (2024) on consumer psychology and behavior indicates that incorporating cultural elements into products positively impacts brand perception. They found that "brand happiness" mediates the relationship between brand richness benefits and purchase intention, increasing consumers' willingness to pay a premium. To support the sustainable development of indigenous communities and local economies, this study focuses on the diversity of bee pollen flora and its connection to indigenous traditions, aiming to inspire the development of high-value-added products.

Materials and methods





Results

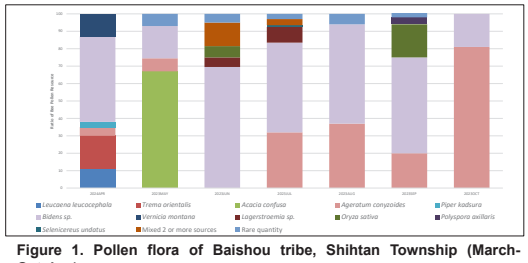


Figure 1. Pollen flora of Baishou tribe, Shihtan Township (March-October).

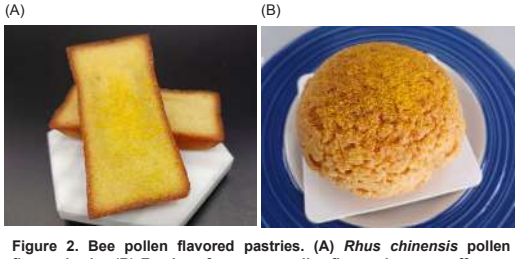


Figure 2. Bee pollen flavored pastries. (A) *Rhus chinensis* pollen flavored cake. (B) *Fraxinus formosana* pollen flavored cream puff.

Table 1. Monthly bee pollen production survey in Baishou Tribe, Shihtan Township.

Location	Baishou Tribe, Shihtan Township, Miaoli County						
No. of colonies.	7 colonies						
Harvest time	4-7 hours						
Production of Bee Pollen(g)							
2023 Apr.	2023 May	2023 Jun.	2023 Jul.	2023 Aug.	2023 Sep.	2023 Oct.	
240	275.3	245	65	96.4	135	95	

Table 2. Analysis of profit increase of bee pollen flavored cake.

	Original pastries price (TWD $/per.)	Price of pastries after adding bee pollen (TWD $/per.)	Price of bee pollen at place of production (TWD $/g)	Profit increase ratio (%)
Pastry	40	50	1.3	21.8
Puff	50	55		7.4

Discussion

Western honey bee (*Apis mellifera*) foraging behavior tends to favor large areas of major nectar and pollen sources. Our survey results highlight the seasonal pollen flora most attractive to Western honey bees; however, the overall plant diversity of the area still requires more detailed investigation. The survey of bee pollen flora provides insights into a portion of the local plant resources and agricultural practices. In this study, the production of bee pollen is not the primary factor in increasing product value. We suggest that integrating indigenous traditions with bee pollen resources, especially incorporating indigenous cultural narratives, is key to attracting consumers and increasing the value of bee products. This study proposes a model that can increase the value of indigenous beekeeping products, thereby contributing to the sustainable development of indigenous communities and rural economies.

PP-498 [Beekeeping for Rural Development]
Increasing the value of beekeeping products by pollen surveys at indigenous tribes in Taiwan

Pen Han Chen[1], Hsu Pei-Shou[2]
[1]Miaoli District Agricultural Research and Extension Station, Ministry of Agriculture, Miaoli County, Taiwan
[2]Miaoli District Agricultural Research and Extension Station, Ministry of Agriculture, Miaoli County, Taiwan1; National Chung Hsing University, Taichung, Taiwan2

Taiwan's indigenous tribes are located in rural areas, and with the lack of job opportunities, young people tend to move to urban areas, resulting in challenges to preserving tribal cultures and sustainable development. Indigenous agriculture needs to be transformed to increase its value, with promising opportunities for young people to stay in their hometowns for careers. Traditionally, indigenous people keep bees for their consumption of honey. The mountainous areas where indigenous people traditionally reside are rich in botanical resources and have a low risk of pesticide residues, leading to a great potential for producing bee products. We surveyed the bee pollen resources of Baishou tribe in Shihtan Township which belongs to Saixia tribal. The area's most dominant bee pollen plant was Bidens pilosa var. radiata with 18.5-69.5% of the overall pollen collected during April-October, followed by Acacia confusa with 67% of the collected bee pollen during May. Although the pollen plants in the area are diverse, only approximately 240 g of bee pollen could be collected by five colonies every seven hours during the spring season (March to May). The production of bee pollen in the area is not recommended as a product directly, thus we assisted the indigenous youth in developing bee pollen-flavored pastries using low quantities of Acacia confusa and Rhus chinensisvar. roxburghii pollen. Traditionally, indigenous people used Acacia confusa and Rhus chinensis var. roxburghii to make agricultural tools, bark clothing, fuel, and salty seasonings. The newly developed bee pollen-flavored pastries successfully combined the plants with traditional wisdom stories and sold them at the local tourist attractions increasing by approximately 21.3% of the profit. This study demonstrated that combining tribal traditions with bee pollen resource surveys can enhance the added value of bee products and contribute to rural economic development.