FLOWER STRIPS AND THEIR IMPACT ON BIODIVERSITY

Südzucker Research 2018 – 2020 in cooperation with the Institute for Agroecology and Biodiversity

Sugar & Beyond

FLOWER STRIPS AND THEIR IMPACT ON BIODIVERSITY

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01. IMPORTANCE OF SUSTAINABILITY AND BIODIVERSITY IN FOOD PRODUCTION

Sustainability is becoming increasingly important in our society. Consumers question the origin, environmental impact, and production methods of food products, thus making it an essential aspect of their purchase decision process. They expect companies to protect the environment and to have a strong sustainability mindset driving their activities. In this context, fostering biodiversity in agriculture has become essential.

Biodiversity is a highly complex system with numerous different species contributing to it in different ways. However, species have been declining for many years now, and many species are on the Red List of endangered species of the International Union for Conservation of Nature (IUCN).

Biomass of arthropods decreased by **-67%** over time[1]

The number of arthropod species declined by **-34%** over time[1]

Insect decline is particularly problematic because insects are indispensable for our ecosystems:

IMPORTANT FUNCTIONS OF INSECTS

- **Pollination** → survival of plant species
- **Food for other animals** → survival of animal species
- **Decomposition of waste** → improving soil fertility through remineralisation
- **Natural plant protection** → controlling harmful insects

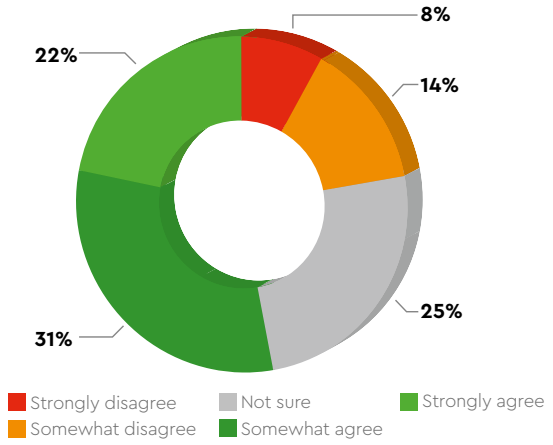
[1] Seibold et al. (2019): Arthropod decline in grasslands and forests is associated with landscape-level drivers. Nature 574, 671–674. https://www.nature.com/articles/s41586-019-1684-3

01. IMPORTANCE OF SUSTAINABILITY AND BIODIVERSITY IN FOOD PRODUCTION

Rising Consumer Demand

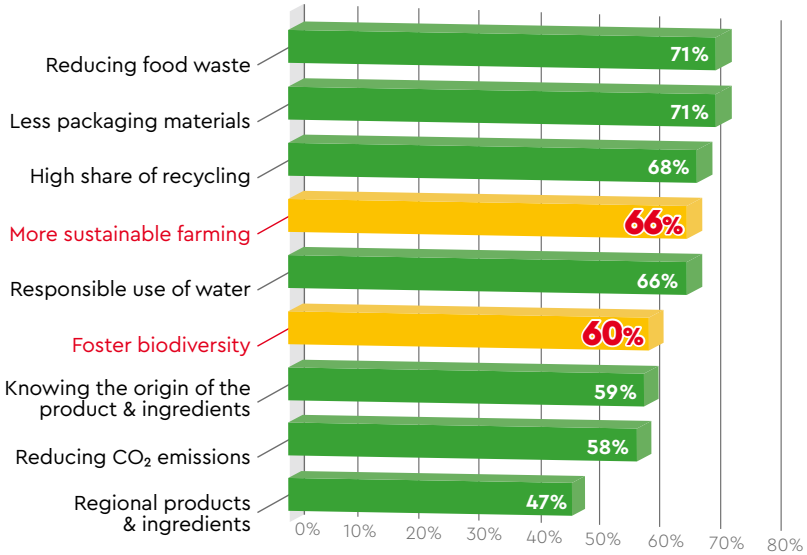
Consumers are concerned about the environmental changes on our planet and the impact of our lifestyle and globalization on our natural resources. Many consumers are therefore changing their lifestyles and consumption patterns to be more ethical and environmentally friendly. In terms of sustainable food production, they increasingly question how our food is produced and expect brands to match their attitudes. To be perceived as authentic, brands must offer maximum transparency and traceability at all levels and take on new initiatives. This also means taking responsibility for the origin of each ingredient and the behavior of suppliers[2]

"Do you think food, drink and supplement brands should do more to protect the planet?"



Source: FMCG Gurus (2020): The Impact of Sustainability – Global 2020, sustainability survey 2019, n=26,000 global consumers

Importance of Sustainability Aspects



Q: When thinking of [product category] how important are the following factors for you?
Online survey 03/21 | n=5,020

For many consumers, fostering biodiversity is a key aspect of promoting sustainable food production. In our latest proprietary consumer study on tomorrow's consumer needs and consumption drivers, we found out, that 66% of consumers consider sustainable farming practices very important. **For 60% of consumers, fostering biodiversity is essential** when deciding on which brand to buy. These results confirm a strong consumer desire for food products with a better ecological footprint and the conservation of our species and ecosystems.

[2]FMCG Gurus (2020): The Impact of Sustainability – Global 2020

02. SÜDZUCKER INITIATIVE FOR BIODIVERSITY

A central aspect of Südzucker's vision for more sustainability in sugar beet cultivation is to conduct research on various agricultural aspects to implement effective measures with our farmers based on the results. One of those research fields is set around fostering biodiversity to preserve and support plant and animal species and the balance of our ecosystems.

We have established research farms in Germany and France to tackle this topic in a very focused way. Small and large-area trials are underway on our core research farm in Kirschgartshausen, Germany.

Growing flower strips in and around sugar beet fields together with our farmers is one of our core activities.

Flower Strips

- provide plenty of food, habitat and shelter for insects and other wildlife in summer and winter
- connect habitats to improve biotope networks
- improve soil habitat by loosening the soil with deep roots
- contribute to humus formation with plant and root mass

Every year, we provide our sugar beet farmers with a specially formulated flowering mixture free of charge, which they can use to create flower strips near their sugar beet fields.

In order to achieve the longest possible flowering period and to attract specific beneficial insects, we have selected specific plant varieties with different flowering dates in the composition of our flower mixes.

03. PIONEERING RESEARCH

(WITH THE INSTITUTE FOR AGROECOLOGY AND BIODIVERSITY)

One major aspect of our work to foster biodiversity is a pioneering research study on the impact of flower strips on biodiversity and biotope networking. Until now, no comparable research was conducted in Germany to that extent and on a representative sugar beet farm like Kirschgartshausen, Germany. To analyze the impact scientifically, we have started a cooperation with the German Institute for Agroecology and Biodiversity (ifab) in 2018 and have been conducting ecological monitoring for over three years now.

The objective was to assess the impact of flower strips on beneficial insects, pests, pollinators, but also on birds and other animal species. Based on this, management strategies for implementing flower strips should be established. In this research, the following questions were addressed:

How do different flower mixtures compare in their effect on biodiversity?

What is the effect on pollinators, beneficial insects and pests?

How can these practices support a more sustainable future and higher biodiversity in sugar beet crop rotation?

03. PIONEERING RESEARCH

(WITH THE INSTITUTE FOR AGROECOLOGY AND BIODIVERSITY)

3.1 Study Design and Research Set-Up

- The study was conducted from 2018 to 2020. A follow-up has been initiated for another 2 years.
- The study was conducted on Südzucker's research farm in Kirschgartshausen, Germany, which encompasses approximately 300 ha.
- The monitoring was carried out in cooperation with the German Institute for Agroecology and Biodiversity (ifab) by means of combi traps and sweep-net sampling. Birds were observed in spring during the breeding season and in winter.

On the Kirschgartshausen research farm, single-year and perennial flower strips with a width of 12 m were integrated into the sugar beet fields on an area of 1.8 to 3.4ha. Per year (2018, 2019 and 2020) two large sugar beet fields of approximately 25ha were planted, one with integrated flower strips and one without flower strips (control). Sweep-net samples were conducted between the beginning of June and mid-September in both sugar beet fields, in the flower strips and in herbaceous habitats adjacent to the control field.

RESEARCH SET UP

■ Flower strips ■ Herbaceous habitats

03. PIONEERING RESEARCH

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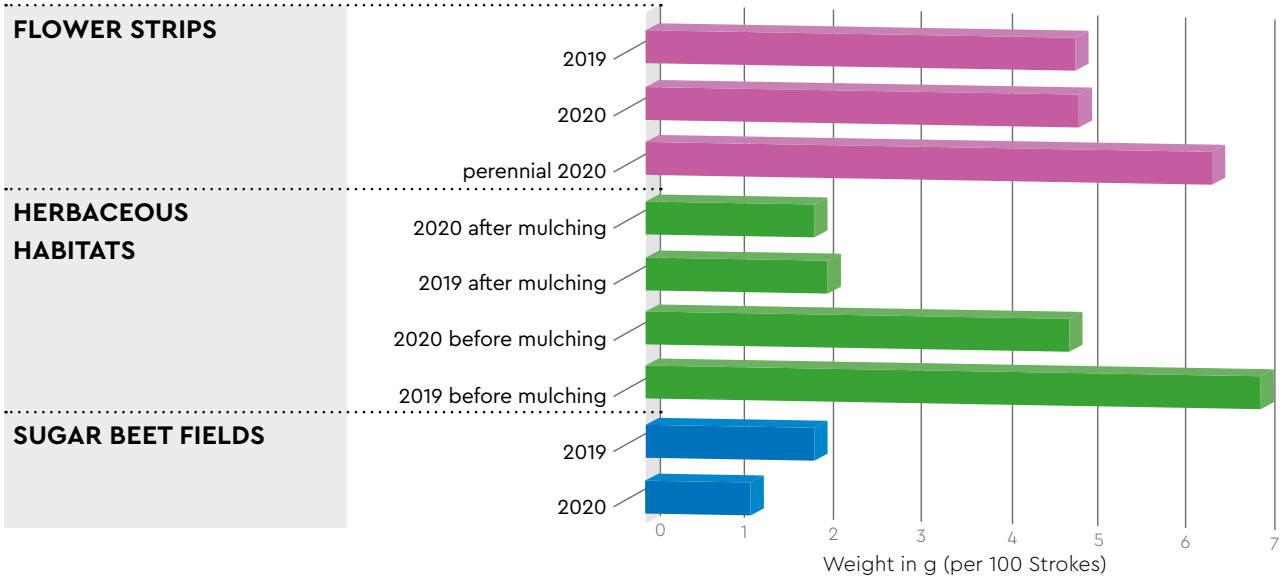
3.2 Results of the Ecological Monitoring

The results of the ecological monitoring show a positive effect of the integrated flower strips on biodiversity. The amount of insects, birds and other animals such as field hares has increased significantly. The habitat created for pollinators and flower-visiting beneficial insects by the flowering plants is particularly noteworthy.

Impact on Biomass

The biomass of all insects caught was **up to 6× higher in the flower strips** than in the sugar beet field. The biomass in the flower strips was as high as in older herbaceous habitats, that were planted between the fields to create a biotope network. However, the biomass is highly dependent on the natural environment and is significantly reduced when the habitats are mulched or mowed.

QUANTITY OF BIOMASS (SWEEP-NET SAMPLES)



Source: Adapted from Südzucker & ifab Biodiversity Research 2020

03. PIONEERING RESEARCH

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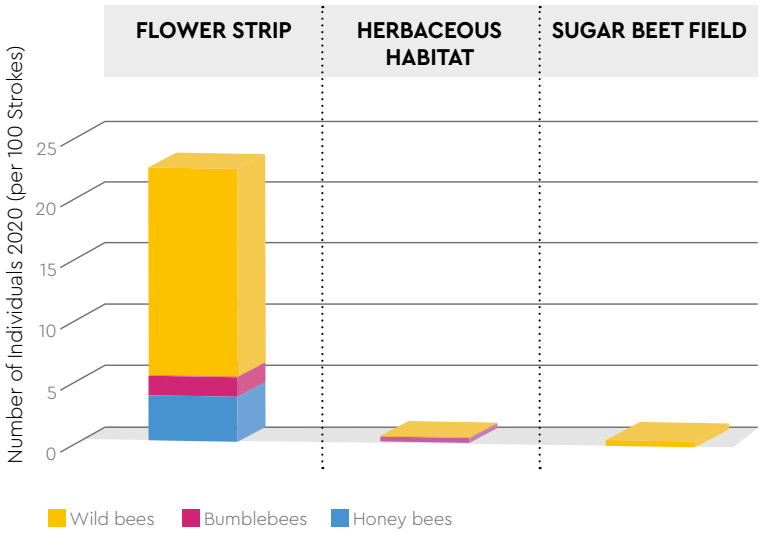
Impact on Species Diversity

By planting flower strips near or alongside beet fields and herbaceous habitats, we also identified a strong increase in pollinator presence in these parts of the field. Flower strips showed a strong increase in the amount of pollinators. In addition to the number of pollinators, their species diversity was also positive. Significant numbers of wild bees were found in the flower strips.

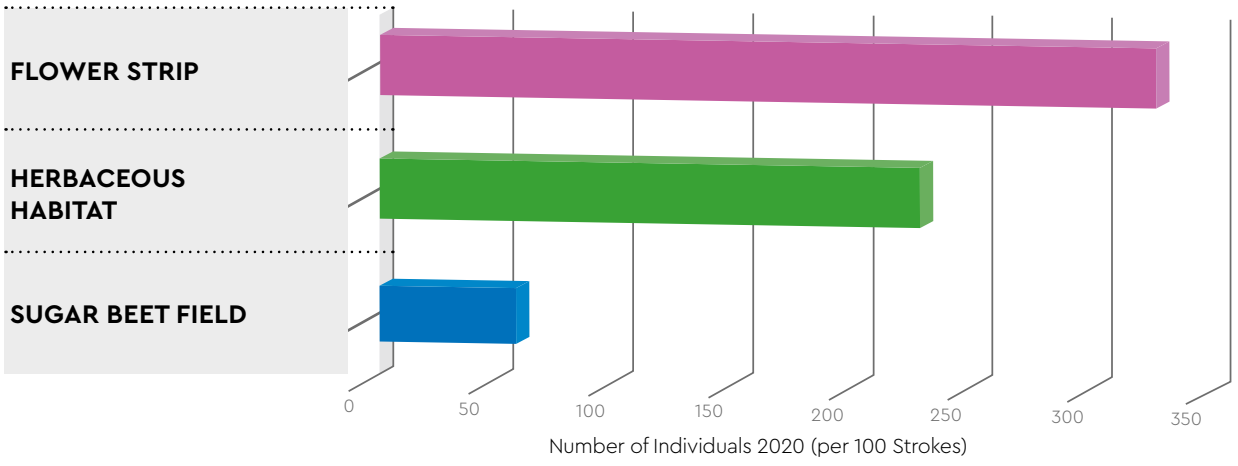
POLLINATORS (SWEEP-NET SAMPLES)



Source: Adapted from Südzucker & ifab Biodiversity Research 2020

There was also a positive increase of natural enemy insects that work as a biological pest control. In the flower strips and herbaceous habitats **4–7 times more potential beneficial insects** were observed than in the sugar beet fields.

NATURAL ENEMIES (SWEEP-NET SAMPLES)



Source: Adapted from Südzucker & ifab Biodiversity Research 2020

03. PIONEERING RESEARCH

(WITH THE INSTITUTE FOR AGROECOLOGY AND BIODIVERSITY)

Conclusion

Our research shows that flower strips have a significant effect on biodiversity. Compared to standard sugar beet fields, we detected in flower strips:

- **Up to 6× more insect biomass**
- **Strong increase in pollinator presence**
- **Up to 7× more natural enemies**

All in all, the research has shown a strong, measurable effect of flower strips on agriculture and the potential for bringing sustainable sugar beet cultivation a step forward. Perennial flower strips show a greater benefit to biodiversity than annual strips because they provide food in a longer flowering period. The maintenance of flower strips over the winter has an additional positive effect on biodiversity. The vegetation provides refuge and cover, but also food and habitat for insects and birds. Generally, one can say that flower strips should be individually adapted for each farm, considering the site conditions.

The research has also shown a positive effect on other animals like field hares and birds. Please get in touch with us if you want to receive more details on this or our study in general.

03. PIONEERING RESEARCH
(WITH THE INSTITUTE FOR AGROECOLOGY AND BIODIVERSITY)

3.3 Future Goals

Because of the study's promising results, we have expanded our cooperation with ifab by another two years to elaborate on the findings, work on additional ways to foster biodiversity in sugar beet cultivation and answer open questions or future challenges. Based on, and in parallel to all this, we plan to enter into more and stronger collaborations with our farmers to support biodiversity.

Besides this, new research farms within the Südzucker Group are developing and expanding to extend research on biodiversity, soil health and a more sustainable sugar beet cultivation. In France, for example, the "Mont Blanc Farm" was recently established and is dedicated to conducting technical itineraries of regenerative agriculture or soil protection agriculture.

Until 2021, about 1,600 flower strips (the size of 266 soccer fields) have already been planted in Germany together with our farmers. Since 2020 we have also started to cultivate flower strips with our farmers in France. Further activities in Belgium and Poland are progressing fast.

In cooperation with our farmers, our goal for 2022 is to increase the number of flower strips to 2,000 flower strips – the equivalent of about 336 soccer fields. We plan to bring the insights of the research to the fields together with our farmers.

04. CREATING VALUE WITH YOUR COMMUNICATION

As consumers increasingly demand more sustainable behavior from the food processing industry throughout the entire production process, the transparency of activities is essential.
Considering that fostering biodiversity is more than creating a pretty landscape, it is paramount to be clear on the actual impact of the implemented measures.
By collaborating with us on fostering biodiversity, you can strengthen trust and loyalty from your current customers or even create new customers by being the first brand in your industry to foster the important field of biodiversity within your sustainability strategy. That can create a clear differentiating factor and advantage going forward.

We are happy to give you access to our insights, knowledge and infrastructure to allow you to communicate with your customers more effectively.

Transparently communicate our joint effort in fostering biodiversity, including goals and activities

Explain the measures taken and their scientifically validated impact with data we can provide

Provide transparency about the sustainable origin of beet sugar as a regional product from farmers who support biodiversity on their fields

04. CREATING VALUE WITH YOUR COMMUNICATION

This white paper features only some of the highlight results of our study. Do you want to receive more detailed information on specific study results like the impact on certain types of species, the right flower mix formulation or how to seed and maintain flower strips?

We are happy to offer you additional insights or advise on how to use the results for your communication with your customers. If you want to collaborate with us on fostering biodiversity, please reach out to us and let's work together to protect our planet.

05. ABOUT SÜDZUCKER

With its 'Sugar', 'Specialties', 'CropEnergies' and 'Fruit' segments, Südzucker is a market-leading company in the food industry. In the traditional sugar segment, the group is Europe's largest supplier of sugar products with 23 sugar factories and two refineries – from France in the west to Belgium, Germany, Austria and Poland, the Czech Republic, Slovakia, Romania, Hungary, Bosnia and Moldova in the east.

Besides Südzucker AG in Germany, Saint Louis Sucre in France, Südzucker Polska (Cukier Krolewski) in Poland and Raffinerie Tirlemontoise are the largest national sugar companies with distribution and local sugar production. Südzucker Group's 'Specialties' segment is active in dynamic growth markets by supplying functional ingredients for food and animal feed (BENEO), frozen/cold products (Freiberger), and starch and portion packs (Portion Pack Europe). The CropEnergies segment comprises the ethanol activities in Germany, Belgium, France and the United Kingdom. The group's fruit segment operates worldwide, is the world market leader in fruit preparations and the European leader in fruit juice concentrates.

With about 19,200 employees, the group generated revenue of € 6.7 billion in 2019/20. With sugar commodities and sugar specialties, the sugar business generates € 2.3 billion, or about ⅓ of group revenue. The production and marketing of beet sugar is the group's strategic core business.

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Additionally, our data protection declaration is available at ***https://www.suedzucker.com/privacy-policy****. There you can find out to what extent and for what purposes we process personal data and what rights the persons concerned are entitled to.*

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Published on: 22.09.2021

Sugar & Beyond