



## The KOB Foundation

For more than 50 years, the facility served as a fruit-growing research institute of the University of Hohenheim before it was transformed into a non-profit foundation in 2000.

- Ministry of Rural Areas Baden-Württemberg
- University of Hohenheim
- Districts of Ravensburg, Lake Constance and Constance
- Württemberg Fruit and Vegetable Co-operative (WOG)
- Lake Constance Fruit Market Association (MaBo)
- Association of Fruit Growers (LVEO)
- Ökologisches Bodenseeobst GmbH (Ökobo)
- OGM Fruit Wholesale Market Mittelbaden eG
- Association for Fruit Growing, Gardening and Landscape (LOGL)

The Lake Constance Fruit Growing Competence Centre to promote environmentally friendly fruit production in the region, thereby preserving its cultural landscape. The KOB foundation undertakes tasks at the intersection of scientific research and practical application.

Within the framework of projects, partly with national and international partners as well as in a global network, research findings are developed and transferred as quickly as possible into fruit-growing practice as quickly as possible. In co-operation with the University of Hohenheim and other institutes, young scientists are supported in research and teaching.

The center's experimental and model orchard, boasting extensive experimental fields and state-of-the-art laboratory facilities, provides outstanding opportunities for applied experimentation and scientific research in fruit growing. Simultaneously, these crops serve as teaching and experimental orchards for fruit-growing consultations, catering to apprentices, trainees, and hobbyists. The main entrance's teaching and showcase garden offer a comprehensive display of various fruit types thriving in the Lake Constance region.



In addition to the extensive experimental fields and laboratories, there's a focused laboratory addressing fruit quality concerns, along with an extensive experimental storage facility housing 96 CA storage containers and several CA trial storage rooms, with a total capacity of 400 tonnes. The facility also offers accommodation for trainees and visiting scientists, providing 14 rooms in a dormitory at the KOB.

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Research  
Advice  
Training  
in fruit growing



# Fields of work in our departments

## Plant health and plant protection

The food trade and consumers alike have a shared expectation for appealing, blemish-free fruit with minimal residue levels, all offered at favorable prices. Achieving this standard hinges upon robust plant health, a fundamental requirement for securing a harvest of superior quality and abundance. In the domain of orchard plant protection, environmental and nature conservation considerations stand as pivotal guiding principles.

In contemporary commercial fruit cultivation, the application of plant protection products follows a targeted approach, initiated subsequent to thorough crop assessments and predominantly guided by predictive models. Adhering to the tenets of integrated and organic production, the primary methods employed encompass a blend of biotechnical and mechanical strategies. Central to these practices is the active integration of beneficial organisms within a holistic strategy.



The plant protection team actively develops novel methodologies in line with Baden-Württemberg's reduction strategy. Funded projects are focused on optimizing specific plant protection measures, devising strategies to combat emerging pests (commonly known as invasive species such as the cherry vinegar fly, problematic bugs, Marsonina), implementing measures to enhance the distribution and promotion of beneficial organisms suitable for practical use, and providing recommendations for utilizing biodiversity as a systemic service. Additionally, there is a concerted effort to enhance low-drift application technology. Through collaboration with research institutions worldwide, innovative methods stemming from foundational research are being translated into initial practical trial applications.

In support of the region's fruit industry, an ongoing collection of data concerning the threat posed by pertinent harmful organisms is maintained throughout the seasons. These data serve as the foundation for continuously updated recommendations and actionable insights.

Furthermore, companies involved in plant protection products and technology benefit from specialized advisory services and testing procedures aimed at optimizing the effectiveness and application of their innovative solutions. This service serves as a resourceful support system for enhancing the efficacy and implementation of advancements in the field.

## Plant Physiology

The crop physiology workgroup focuses on a range of production-related and practical research areas, including:

- Regulation of fruit set employing both chemical and mechanical thinning methods
- Enhancement of fruit set for optimal canopy management

- Exploring methods for controlling fruit growth
- Improving plant nutrition through soil enhancement and foliar fertilization
- Facilitating exposure and enhancing fruit coloring
- Studying training systems and rootstocks
- Integrating digitalization into fruit growing practices (such as camera-supported blossom thinning and predicting physiological fruit diseases based on sensor data during cultivation)
- Implementing demand-oriented irrigation practices



## Post-harvest physiology

In fruit production, a critical challenge lies in preserving quality post-harvest to ensure a sustained supply of tasty fruit to the population. Quality-preserving storage methods alleviate market pressure during the harvest and safeguard the income of producers.



Post-harvest physiology involves conducting basic research and practical trials on fruit ripening, harvesting, and the preservation of various fruit types. Key focuses include energy conservation during storage, exploring alternative refrigerants and more efficient refrigeration systems. Innovative storage techniques like DCA, respiration quotient, among others, are studied along with changes in fruit composition during storage. Monitoring the quality development of fruit varieties throughout the season is crucial, guiding the development of optimal storage strategies to prevent damage. Climate change adds new complexities in determining storage ripeness, requiring testing of new varieties for storability and tailored storage recommendations.



Marketing organizations and technology-involved companies benefit from ongoing advice on storage practices and expert insights into upcoming challenges and technical innovations.

## Organic fruit growing

Organic fruit cultivation has gained significant prominence in the Lake Constance region. Since 2020, Baden-Württemberg has aimed to increase organically cultivated areas to over 30% by 2030 through the Biodiversity Strengthening Act. The Department of Organic Fruit Growing has actively supported the development of this method on Bioland-certified areas since 2004, establishing an organic trial and model farm at the KOB in 2012.



Efforts are dedicated to addressing unique challenges and refining the cultivation system within the broader framework of the „organic orchard.“ The practical research is facilitated by close collaboration with practitioners in the Organic Trials Advisory Board and the Ökologischer Obstbau e. V. advisory service based at the KOB. Active participation in national and international projects facilitates the exchange of experience, the discovery of novel insights, and injects fresh momentum into the region.



## Variety testing

New fruit varieties are at the centre of the fruit industry's interest as innovations. Variety testing comprehensively examines the characteristics of new fruit varieties according to a standardised evaluation scheme based on fruit-growing performance testing. Vegetative and generative characteristics as well as fruit characteristics before and after harvest.

Aspects of the market and consumer assessments of specialised areas are included in the assessment of a fruit variety. In consumer tests, 125 households are regularly supplied with the latest apple varieties and asked for their impressions. Every year, around 200 new apple varieties and mutants and around 70 pear varieties are tested at the Kompetenzzentrum Obstbau Bodensee.



## Conservation varieties and extensive orchards

In Germany, Baden-Württemberg boasts the largest expanse of orchards housing a myriad of traditional fruit varieties. The Baden-Württemberg Variety Preservation Centre (SEZ) situated at the KOB plays a pivotal role in safeguarding heritage apple and pear varieties from potential extinction. Presently, the SEZ proudly maintains over 1000 apple varieties and more than 400 pear varieties in its preservation gardens. Since 2006, the SEZ has been a significant partner within the German Fruit Genebank network.



Functioning as a service provider, the SEZ assists associations, initiatives, and individuals devoted to variety preservation. It aids in variety selection and scion procurement, verifies the accuracy of existing variety gardens, facilitates fruit variety exhibitions, and aids in identifying unknown varieties. Evaluating fruit characteristics not only unlocks enhanced utilization prospects but also forms the basis for the development of new varieties. Moreover, the SEZ provides expertise for revitalizing existing orchards and establishing new ones.



## Agri-PV project at KOB Bavendorf

Within fruit cultivation, the Agri-PV project at KOB Bavendorf responds to the escalating trend toward protected cultivation, particularly due to climate change. The strategic use of films and nets acts as a shield against weather-related adversities like hailstorms, sunburn, and moisture-induced pest infestations, effectively reducing pesticide usage. To further curtail material usage in protected cultivation while harnessing the area for energy production, integrating solar modules into protective systems emerges as a viable option, supplementing their protective functions.



Collaborating with the Fraunhofer Institute ISE, the KOB delves into examining the impact on plant cultivation and economic outcomes by leveraging fruit cultivation areas for energy generation using photovoltaics. The principal objective of the KOB's project revolves around creating and implementing an agri-PV prototype specifically tailored for pome fruit cultivation, monitored through scientific means.

## Obstbauberatung Bavendorf GmbH (OBB)

As a certified consulting entity, OBB extends individual farm consultancy services encompassing production technology, storage, and business management, in collaboration with the operational sectors at KOB. Enterprises within Baden-Württemberg stand eligible for funding of up to 80% as part of the modular advisory programme.

## Biodiversity

Shifting gears to biodiversity, contemporary agricultural practices shoulder some responsibility for the diminishing biodiversity. The precise impact of certain interventions, like alterations in production methods or habitat removal, remains inadequately understood. Conversely, diverse habitats such as orchards have been cultivated extensively and demand consistent management.



Typically, modern orchards provide conducive environments for insects and birds owing to their prolonged existence. Implementing diverse practical measures holds the promise of notable enhancements, allowing for the integration of biodiversity within contemporary orchard management paradigms. Collaborating closely with research institutions, the fruit industry, and conservation groups, KOB actively identifies opportunities to augment biodiversity within commercial orchards and translates these possibilities into actionable practices.

## Farm management and market

The cornerstone of farm optimization and developmental planning begins with a thorough analysis of the farm's current state. To achieve this, KOB conducts a comprehensive review of financial records, to determine relevant key business figures, including full-cost accounting. Data protection measures ensure complete confidentiality or anonymity upon request.

Moreover, beyond the vertical assessment of individual farms, participation in a horizontal comparison facilitated by collaboration with ZBG in Hohenheim is available. This benchmarking initiative effectively delineates the strengths and weaknesses of each farm, offering insights into necessary adjustments in production techniques or organizational structure. A careful study of financial statements forms the basis for devising investment strategies and providing personalized counsel on management matters.

For more than five decades, the institute / KOB foundation has analyzed pome fruit prices on a weekly basis, in partnership with LEL Schwäbisch Gmünd. This steadfast quotation practice in fruit markets contributes significantly to enhanced market transparency and reinforces negotiating positions for fruit producers and marketers, particularly when engaging with buyers. Notably, the KOB price quotation's proximity to consumer-rich regions holds considerable value even within European regions characterized by higher production levels.

## Training and further education at KOB

Training and continuing education opportunities at KOB span diverse levels, catering to interested individuals globally. The compelling amalgamation of research, hands-on application, and the expansive array of work domains, each with its distinct teaching modules, presents an enticing proposition.

These educational avenues encompass:

- Specialized training for aspiring horticulturists focusing on fruit cultivation
- Enrollment in a dual study program
- Internship programs designed for school pupils, encompassing voluntary orientation periods and mandatory student internships
- Pursuit of scientific theses, spanning Bachelor's, Master's, and doctoral levels, in collaboration with various universities
- Engaging guided tours and comprehensive courses