

Research for Pure Great Wine

KIT Scientists Use Crossing to Strengthen the Natural Resistance of Vines

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FOTO: FOTOLIA JAG_CZ



Wine grown in the region of Baden is pampered not only by the sun, as the advertising slogan suggests, but also by science. At any rate, one of the leading European experts in ecological and sustainable viticulture, Professor of Botany Peter Nick, is teaching and conducting research at the KIT. The botanical garden of the Institute can boast of a unique collection of natural and cultivated vines. What may seem exotic at first in a largely technical and scientific university is based on sound regional tradition. Friedrich Hecker, after his emigration to the United States of America, kept in contact with Adolph Blankenhorn, wine grower in the Kaiserstuhl region. "A major topic of concern at that time was damage caused by

phylloxera," says Peter Nick. Hecker, a former revolutionary who had taken part in the revolution in Baden, now a farmer, had discovered that the roots of natural American vines were resistant to this pest. He then had an excellent idea to send some seeds to Blankenhorn. The vine roots grown from them were to be grafted onto our sensitive cultured vines, a procedure practiced in viticulture to this day. "The problem of European vines," says Peter Nick, "is that people breed vines only for high yields at the expense of other properties, such as resistance to mildew." Particularly in rainy years, such as 2013, downy mildew could destroy large parts of the vintage.

Another regional accident resulted in intense vinological research at the KIT. The Rhine peninsula of Ketsch near Mannheim is a place where various natural European vines grow that are almost extinct elsewhere. This had been known to botanists, but thanks to Peter Nick and his co-

workers the botanical garden of the KIT now has grown a complete copy of this population of natural vines, which will partly be planted back in the valley of the Rhine river. "We thoroughly studied all variants and found that many natural vines are resistant to mildew and other pests."

In this process the Karlsruhe scientists detected three different mechanisms. "Firstly, many natural vines carry a sort of ring seal in the openings of their leaves which prevents germ tubes of pests from entering. Secondly, others produce increased amounts of resveratrol, an antioxidant acting as a natural fungicide. And thirdly, some natural vines secrete nonanal all over the leaf, a substance which normally acts as a kind of 'bad breath' guiding the spores to the gap openings of the leaf. However, in natural vines, downy mildew is confused." Now the vines are to be crossed until they carry the three natural defense mechanisms. Introducing only one of them would not be sufficient because nature was quite inventive in overcoming resistance. "Pyramidization" is the technical term for this synergy effect produced by biological "triple arming."

Peter Nick works hard in the interest of maintaining biodiversity, i.e. the largest possible gene pool. "This is not only a playing field for ecologists but is in the interest of mankind and the economy," explains Nick. "It can be seen particularly well in viticulture." Those who protect and cultivate European natural vines will very soon be able to enjoy a healthy, ecological type of wine grown without any chemistry. Nowadays, vineyards are sprayed up to 15 times in a season; the Müller-Thurgau variety is considered particularly susceptible to downy mildew.



FOTO: MARTIN LOBER

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Peter Nick also created the "Rhine Wine Symposium," which was organized for the eighth time in May 2013. It sparked off a research network funded by the "EU Interreg Program" under the name of "Bacchus – Research for Sustainable Viticulture." "Viticulural research in Baden has always been strongly connected with France, Switzerland, Italy, and Spain. We started in a backroom eight years ago; this year, forty participants attended," says Nick. The research network received a lot of public attention, like much of the work conducted by Peter Nick, which is no surprise because "Bacchus conducts research in the interest of pure wine," as one of the headlines proclaimed. In a nutshell, and expressed in more precise terms, Peter Nick and his colleagues firstly conduct fundamental research, secondly ensure biodiversity, and thirdly work for pure wine by means of biological crop protection. Incidentally, there will never be such a thing as KIT wine. Yields are too low for that. "However, the natural vines do include tasty grapes with a pleasant, slightly acidic cassis flavor." ■

Forschung für reinen, feinen Wein

KIT-Wissenschaftler stärken durch Kreuzungen die natürlichen Abwehrkräfte der Reben

Der Botaniker Peter Nick ist einer der führenden Forscher im Bereich ökologischen und nachhaltigen Weinbaus. Das hat gute badische Tradition, die zurückreicht bis zum berühmten badischen Revoluzzer Friedrich Hecker, der sich nach seiner Emigration in die USA auch mit der Bekämpfung der Reblaus beschäftigte. Inzwischen sind im Botanischen Garten des KIT verschiedene, fast ausgestorbene europäische Wildreben „in Kopie“ herangewachsen, die den KIT-Forschern dazu dienen, neue Verfahren zur biologischen Schädlingsbekämpfung zu entwickeln.

Die Karlsruher Wissenschaftler fanden drei unterschiedliche Mechanismen. „Erstens hat manche Wildrebe in ihren Blattöffnungen eine Art Dichtungsring, sodass die Keimschläuche der Erreger nicht eindringen können. Zweitens bilden andere ein natürliches Fungizid. Und drittens sondern manche Wildreben an allen Stellen des Blattes einen Stoff ab, der als ‚Mundgeruch‘ die Sporen verwirrt.“ Ziel sei es nun, die Weinreben so lange zu kreuzen, bis sie möglichst alle drei natürlichen Abwehrmechanismen besitzen.

Peter Nick liegt die Erhaltung eines großen „Gen-Pools“ am Herzen. Wer die europäischen Wildreben schützt und pflegt, bekommt in naher Zukunft einen gesunden und ökologischen Wein, der ohne Chemie angebaut wurde.

Peter Nick hat auch das „Rhein-Wein-Symposium“ ins Leben gerufen, das im Mai 2013 zum achten Mal am KIT stattfand und aus dem das Forschungsnetzwerk „BACCHUS – Forschung für den Nachhaltigen Weinbau“ hervorgegangen ist. ■