He was 45 years old when he planned the experiments in the Ticino chestnut forests. But he will no longer learn the results of this large-scale experiment, at least not as an employee of WSL. Andreas Zingg is about to retire. He has dedicated nearly all his professional life to growth and yield research, how forests and thus the volume and quality of wood change with different management systems. And yet he never intended to work at WSL: “When I was a student, there two things I definitely never wanted to do,” says Zingg, who has a forestry degree from ETH, with a grin. “Make inventories and work at the research institute.”

But he does not regret his time at WSL, even though a forest researcher requires a lot of patience. “Compared to a person, trees and forests grow very slowly. A problem that we look into today may no longer interest anyone later on when the results are available,” says Zingg. He has to live with this risk. So it is all the more important that the results of the research can be used for other questions. Such as in Ticino, for example.

**Earn more from chestnut wood**

Since the time of the Romans, who brought the sweet chestnut to Ticino, this tree species has been enormously important for our southern-most canton. Chestnut forests now grow everywhere where there were originally lime and mixed oak forests, and the chestnut is the most important hardwood species on the southern side of the Alps. The people of Ticino have used their ‘castagni’ in a number of different ways over the centuries. They produced the fruit in their chestnut orchards, and for years it was their most important food product. In the coppices – forests that are cut down completely every 12 to 20 years – it is used for fuelwood or turned into vine stakes and fence posts. Those times are now past: as the coppices generate too little profit, the forest owners have hardly used them for the past 50 years and the chestnuts grow unimpeded.

Zingg and his colleagues have made it their goal to change this. Zingg: “What we hope to achieve with this large experiment is to make chestnut wood an attractive product again. We’re testing innovative methods of management of the chestnut woods, so the timber can be used not only for heating, but also for furniture or flooring.” Compared to a cubic meter of fuelwood, which currently costs about CHF 50, several times this amount can be earned from high-grade timber. If the coppices become attractive again for the forest owners, the chances that this important part of the landscape in Ticino will be maintained will increase as well.
A previous WSL study encouraged Zingg to carry out the Ticino field trials. Chestnut wood is comparable to oak in terms of quality. Unlike oak, however, chestnut tree suffers from ‘ring shake’, a defect that causes the wood to come loose along the growth rings as a result of strain or injuries. A board that has been affected by ring shake may fall apart or have holes in it. But not always. Zingg: “Patrick Fonti, a former doctoral student and current employee at WSL, learned that there tends to be no ring shake if the tree grows in a location with good access to water and nutrients, is able to form regular annual rings and is not more than 40 to 60 years old.” As a result, Zingg set up three test sites in the 1990s, working with Marco Conedera and colleagues at the WSL field station in Bellinzona, as well as researchers from Arezzo in Italy. All three test sites are in the ‘chestnut belt’. They differ mainly in terms of elevation, aspect, gradient and earlier management. One of these sites is in Bedano, a village in the Lugano region.

The test lab is almost as big as three football pitches

The area still produces large, beautiful ‘Torcion négro’ fruit – the best chestnut species in Ticino – and the test site was previously used as an orchard. However, this stock of pure chestnut trees has been used as a coppice for more than 50 years. As at the other two test sites, the two researchers use three types of silvicultural techniques in the forest, which is approximately two hectares large, with each technique repeated three times. Zingg: “We clear-felled the entire area in 1998. The stools of chestnut trees that have been cut always sprout again vigorously. On one part of the site, the control area, the trees have grown unhindered since then.”

As part of the second management system, after eight years the researchers selected crop trees – trees that grow straight and form a regular crown. They released these trees from the most vigorous competitors and pruned them a year later to a height of six meters in order to create the best growing conditions for a good crown shape and to ensure the high quality of the lower trunk. They have since carried out this procedure once more.

Under the third management system, after eight years they left half of the dominant coppice shoots standing and cut the other half down. This management system has also since been repeated once. Since 1998, employees at the Bellinzona field station measured each tree annually on the two-hectare test site in accordance with a protocol that is used at all growth and yield research test sites. The metrics include position, tree species, diameter and height, and ‘social position’. If, at the end of the experiment, it turns out that no one in Ticino is interested in chestnut wood, these data can be used to answer other questions, such as how chestnut forests develop with climate change.

The large-scale experiment is planned to take about 30 years. After that, the entire site will be completely clear-felled again according to the coppice management. But the initial trends are already apparent today, after just 17 years. Conedera: “To us, it seems best to develop the option with the crop trees.” These trees have a considerable diameter of about 30 centimeters and far exceed the crowns of the other trees. This development stands in contrast to the practice in Italy. Conedera: “Some of our crop trees were grown from...

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seed. So they’re quite straight. In the drier, Mediterranean climate in Italy, the seeds only germinate and establish in exceptional years, so there it is better to rely on re-sprouts and thinning out half of them.”

Despite these initial findings, few people in Ticino seem interested in implementing this new type of coppice management; to date, only one forester has been persuaded of the method. This is no surprise to Zingg: “Foresters
are generally somewhat conservative, and,” he says with a wink, “their social psychology is an entire topic in itself.”

**Wood – an alternative to oil**

WSL now has a total of 131 growth and yield research test sites in Swiss forests such as the one in Ticino, covering a total of some 130 hectares. Some of these sites have existed since 1886, the year the research institute was established. The years of data series are correspondingly valuable. Unlike the experiments in Ticino, most of these tests involve case studies. Zingg: “There have been very few experiments in growth and yield research to date that allow us to make a statistically representative statement. In the future, WSL will increasingly rely on such studies as in Ticino’s chestnut forests.” Just as the work with computer models, it will be possible to extrapolate the future value of wood under various site conditions and management methods. For Zingg it is clear: “With oil in increasingly short supply, wood, as a renewable resource, will become increasingly important. So it is all the more important to test and develop sustainable forestry processes in a timely manner.” Zingg found the motivation for his many years of work as a result of this conviction. Nevertheless, he is looking forward to retirement and being able to enjoy the chestnut forests solely for their beauty. 

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