

Genetic markers in olive breeding to bring cheaper, higher quality oil to consumers

• By SHARON UDASIN

Identifying genetic markers in particular olive subspecies will be a key step toward advancing the quality and marketability of the region's age-old table oil, according to an Israeli industry veteran.

"Once we have genetic markers, breeding will be much easier and much cheaper," said Prof. Shimon Lavee, a renowned expert on olive-oil cultivation, at the Hebrew University's Robert H. Smith Institute of Plant Science and Genetics in Agriculture.

Lavee was addressing scientists at a conference in his honor - Olive Culture: Past, Present Future - held at the Hebrew University's Robert H. Smith Faculty of Agriculture in Rehovot, and organized by the Israeli Olive Oil Board in collaboration with the Volcani Institute and the International Olive Oil Council.

By pinpointing genetic markers on various subspecies of olives, it will be possible for researchers to develop fruits better able to withstand diseases and generate a more attractive product for consumers, he explained.

"I do think that the major effort at the moment has to be breeding for resistance, resistance of diseases," Lavee said.

Despite the fact that olives have been used for Mediterranean cooking and healing for thousands of years, the breeding, planting and cultivating processes associated with the fruit's production is still evolving. New planting systems have been pushed forward all over the world, with research ongoing as to the use of brackish and recycled water in water-scarce countries down to the very genetics of the fruit, Lavee showed in his presentation.



PROFESSOR SHIMON LAVEE examines olive trees. (Courtesy)

"We still don't know what are the ideal distances in each country, in growing conditions in each country, what are the planting systems, what are the training systems for different varieties," he said.

The study of the chemistry and composition of olive oil began at the beginning of the last century, but the idea of standardizing organoleptic benefits and drawbacks to olive oils was initiated only with the development of the International Olive Oil Council 40 years ago, Lavee explained.

Organoleptic properties, which have now become key components associated with olive oils, are qualities of a substance as experienced by the senses, such as taste, color, odor or feel.

"It's the only commodity in the world where 'organoleptica' is part of quality determination," Lavee said.

Once genetic markers are identified, scientists will be able to generate a higher qual-

ity product through traditional cross-breeding, as genetic engineering in olives is still not yet permitted by law.

"Imagine if you could take the property of one olive and transfer it to another variety without changing the rest of the properties like you do in cross breeding, you might get the most advanced varieties possible," Lavee said.

In order for genetic engineering in olives to become legal, however, researchers would need to be able to prove that they were not involving bacteria or other outside organisms in the gene transfer, he explained.

"If we could succeed in developing methods to take the property from an olive and bring it to another olive without having an intermediary of a bacteria or another plant, then we could open up genetic engineering for olives," Lavee told *The Jerusalem Post*.

Yet, by identifying genetic markers and acquiring a full

picture of the olive genome, scientists soon will be able to choose preferred varieties of olives, even without using genetic engineering, Lavee explained. With such markers, researchers would be able to choose among characteristics such as disease-resistance strength and oil quality while performing classical breeding, he added.

"The idea for the future is to develop varieties where you need a minimum of spraying, minimum of affecting the environment," Lavee told the *Post*. "Even if we cross them in the classical way, we have a better chance to get what we want to get."

Scientists in Israel and around the world are already making significant headway in this process, and Lavee predicts that within another five years they will have sufficient knowledge to move ahead.

"The genetic processes will be the future," added Dr. Adi Naali, manager at the Israel Olive Oil Board. "We are working hand-in-hand with the science to promote the innovation in this sector, to decrease the resources so we can achieve better yields with less input while maintaining the high quality of Israeli olive oil"

Genetic markers, Naali said, will "give us the next kick for the industry, so we can produce high quality Israeli olive oil and supply the public with high, fresh and good quality local Israeli olive oil."

Once the genetic markers are mapped out for use in even the classical breeding scenario, Lavee stressed that consumers will have access to potentially cheaper and higher quality olive oil products with attractive properties like increased antioxidant presence.

"This is what we have to do."