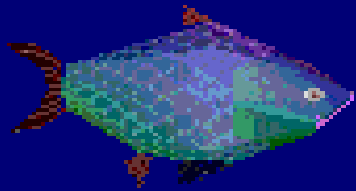


INNOVATION

Research for Tomorrow's Agriculture

Prof. S. Harpaz



Department of Aquaculture

Institute of Animal Science

Agricultural Research Organization

Israel

Agri is our Culture

From Biblical Times to Nowadays



Necessity is the mother of invention





Drip Irrigation



Desert: past and present



1959



1979



1999



Desert Aquaculture





R&D - Potential extension of Water Resources

Irrigation technologies, purification and recycling, desalination

- Marginal water - saline and brackish water
- Waste water treatment technologies and recycling
- Desalination technologies
- Water saving: drip irrigation improved irrigation practices, precision agriculture, leak prevention.

Water Treatment & Recycling



Drip Irrigation

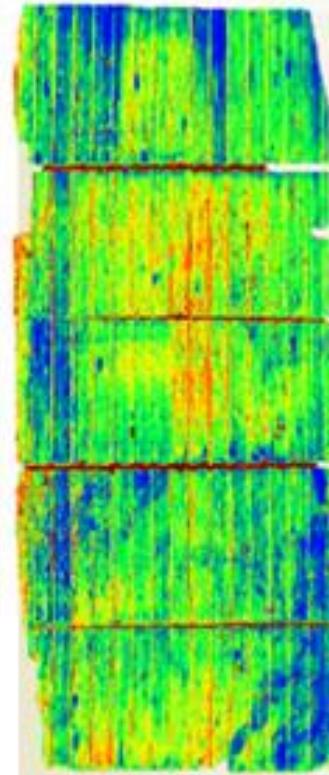


Precision Agriculture

Thermal Imaging for Water Status Mapping

Thermal imaging exposes differences in water status of plants which cannot be detected visually.

With adequate analysis and models thermal images can be transformed into:
Water status maps
for decision-making in irrigation



Legend:

Over-irrigated

Regular irrigation

Low stress

Medium stress

Severe stress



Shading with different color nets





Effects of **blue** or **yellow** nets on lupine





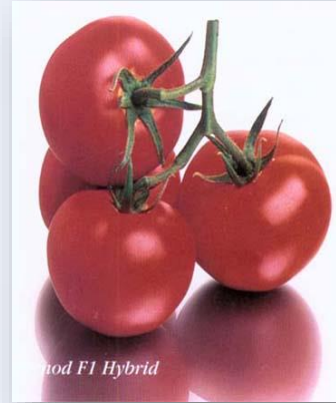
Market directed breeding



Yield



Shelf life



Taste
&
appearance



Nutritional
quality

<1970'

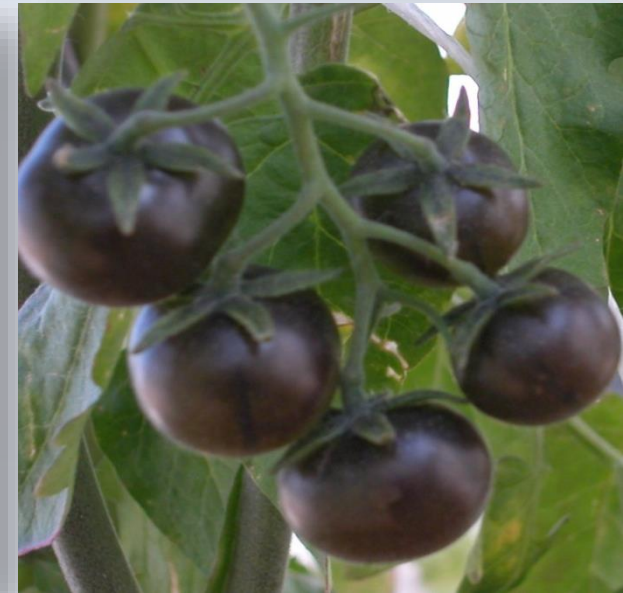
1980'

1990'

2010'>



Development of Functional Tomatoes



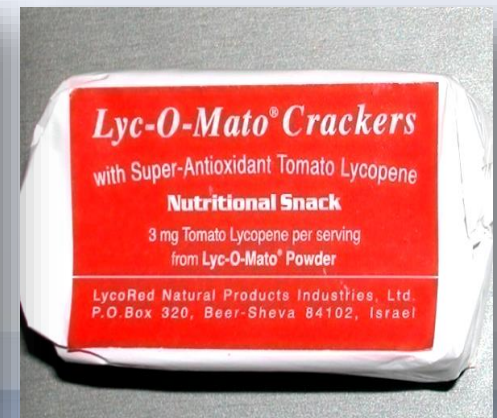
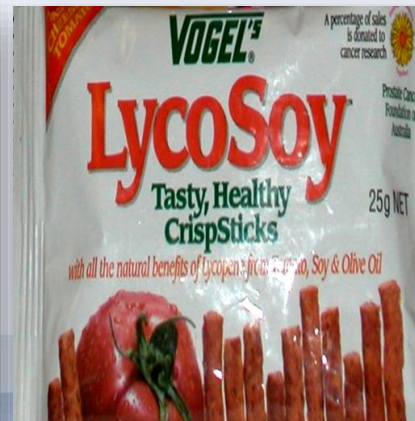
Major goal:

Develop elite, fresh market tomato cultivars possessing fruits enriched with key functional metabolites: carotenoids (mainly lycopene), Vitamins C and E, flavonoid compounds



Noteworthy Achievements:

- Breeding and introducing elite high pigment to fresh-market **tomato cultivars**.
- Identification of genes and gene interactions contributing to **increased nutritional quality** in fruits and vegetables.



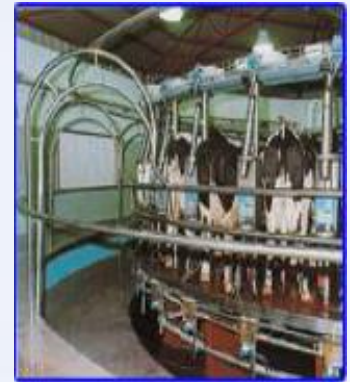


Genomic selection in the Israeli dairy cattle

The use of genetic markers to increase rates of genetic progress in breeding programs

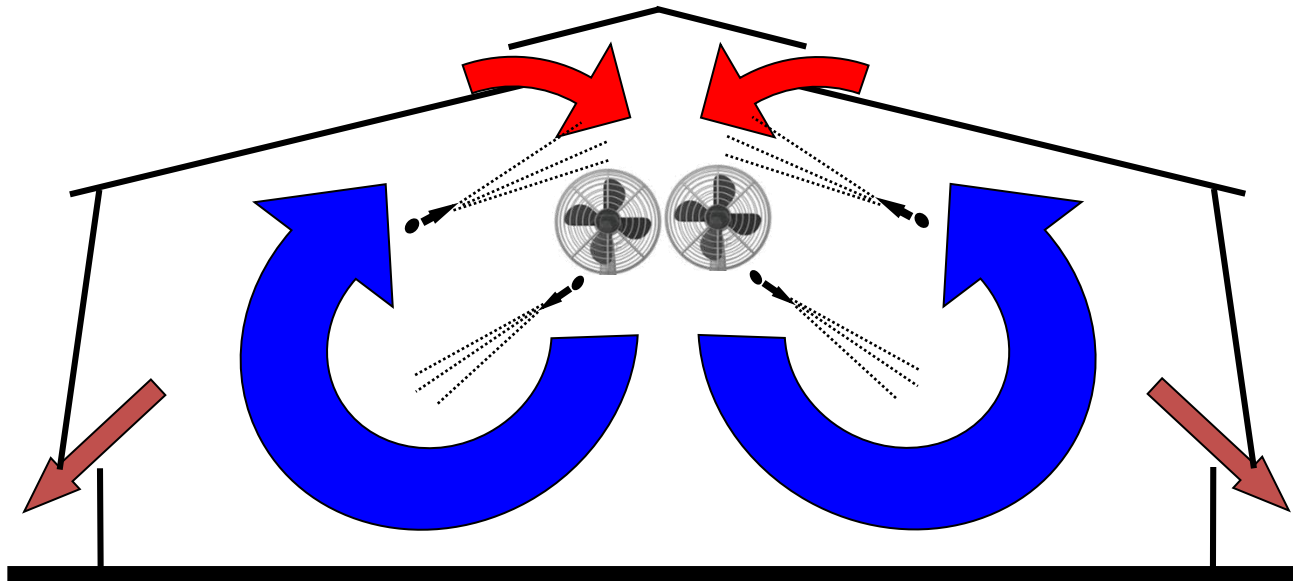
Cows with potential for high yields of milk have been bred – development of special feeding equipment and automatic milking – has led to saving in manpower and hygienic. The Israeli cow gives an average of 11,681 kg of milk per year, **significantly outpacing** every nation in the world.

Genotyping with BovineSNP50



Increasing Animal Welfare

ARO Cooling System



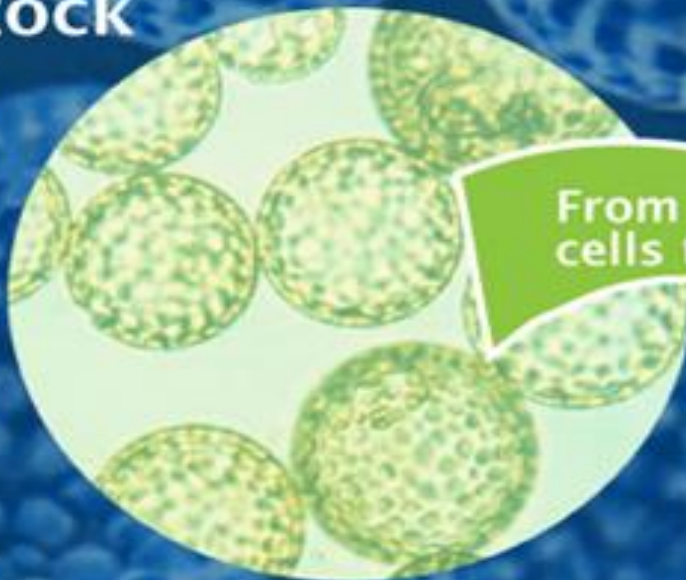
- Saves 8%-10% on infrastructure
- Saves 20% on energy costs.



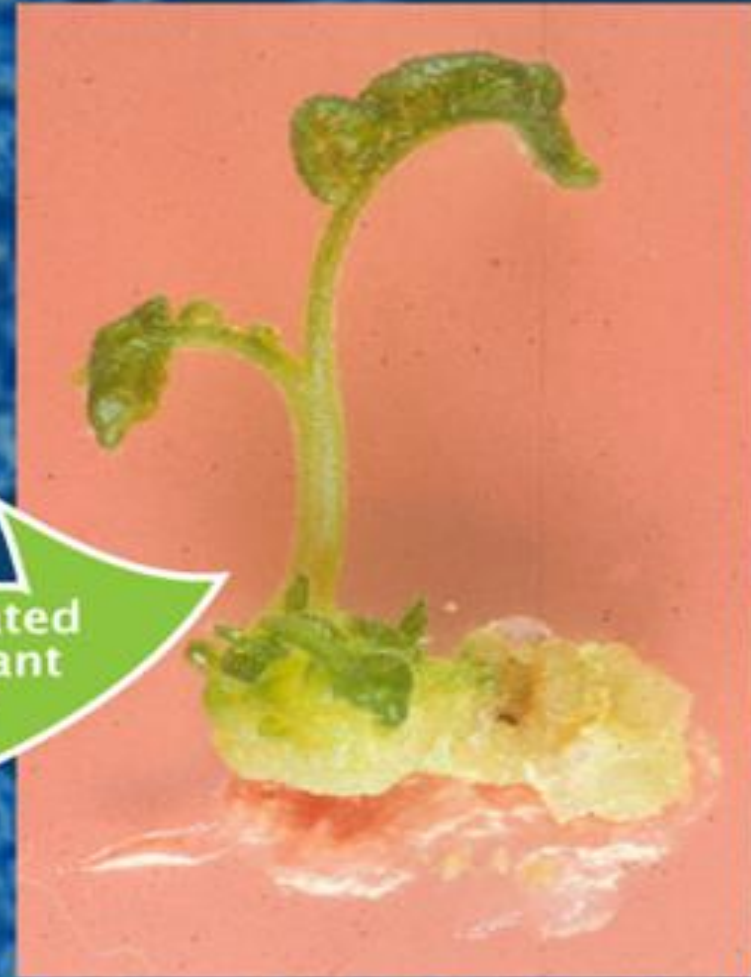
Agricultural Biotechnology

Scientific approach to improve:

- ❖ Yield and quality
- ❖ Nutritional values
- ❖ Resistance to pests, pathogens and environmental stress
- ❖ Applicable for crops and livestock



From isolated cells to plant



Commercial implementation subject to EU regulations

Improved Efficiency



Number of People Fed by One Farmer:



Israel

In 1955

15



In 2007

100



In 2016

200



Worldwide

In 2007

Developing countries:

2-20

Developed countries:

90-120

Innovation/Sophistication in Postharvest Practices in Israel

New technology



New storage technology



Sophisticated produce



Grain Storage Technologies in Israel



As a result of efficient monitoring, intensive R&D of innovative methodologies and technologies, grain losses in Israel do not reach levels ***higher than 0.5%***.

