**Joseph Burger**  **December, 2016**

**Part I: CURRICULUM VITAE**

1. **Personal**

Department of Vegetable and Field Crop Research

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Web –site: <http://www.agri.gov.il/en/people/737.aspx>

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| **Dates** | **Description** | |
| 1956 | | Born in Modor-Laposh, Romania, September 27, |
| 1967 - 1973 | | High-school education in Midrashiat Noam, Pardes Hana. |
| 1974 - 1977 | | Military service |

1. **University Education and Additional Training**

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| **Dates** | **Description** |
| 1977-1980 | B.Sc. in Field Crops at the Hebrew University, Faculty of Agriculture, Rehovot, Israel |
| 1984-1988 | M.Sc. in Plant Science at the Hebrew University, Faculty of Agriculture, Rehovot, Israel.  Title of thesis: Leaf silvering in summer squash (Cucurbita pepo L.) – Physiological and ecological aspects.  Supervision by: Prof. A. Schwartz and Dr. H. S. Paris. |
| 1993-2000 | Ph.D. in Horticulture Science at the Faculty of Agriculture, Rehovot, Israel.  Title of thesis: Sucrose metabolism in melon fruits (*Cucumis melo* L.): The biosynthesis of sucrose from translocated stachyose and the role of the invertase enzyme in determine sucrose accumulation.  Supervision by Dr. A. A. Schaffer and Prof. J. Riov. |

1. **Positions Held and Academic Status**

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| **Dates** | **Description** | |
| 1981 to 1984 | Research Assistant at the ARO, Newe Ya’ar , Institute Vegetable and Field Crop Research. | |
| 1984 to 2001 | Research Engineer at the ARO, Newe Ya’ar , Institute Vegetable and Field Crop Research. | |
| 2001 to 2006 | Research Scientist “B” at the ARO, Newe Ya’ar, Institute Vegetable and Field Crop Research. | |
| 2006 to present | | Research Scientist “A” at the ARO, Newe Ya’ar, Institute Vegetable and Field Crop Research. |

1. **Training / Teaching Experience**
2. Academic Contribution:
3. Guidance of M.Sc. Students:

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| **Graduation date** | **Name** | **Title of thesis** | **Guidance with** |
| 2005 | \*Ms. D. Bastyker | Flesh and skin color in melons: mapping and identified genes controlling those characters. | Dr. N. Katzir (ARO) and Prof. S. Gepstien (Technion) |
| 2005 | \* Mr. B. Wasserman | Genetics of fruit flesh coloration in melons | Dr. Y. Tadmor (ARO) and Prof. B. Horowitz (Technion) |
| 2007 | Ms. A. Yaniv | Chemical mutagenesis in melons: Identification of new genetic and phenotypic variation | Dr. Y. Tadmor, (ARO) and Prof. D. Zamir (Faculty of Agriculture, Rehovot) |
| 2009 | Mr. I. Yaakov | Flavonoids- a new pigmentation system in melons (*Cucumis Melo*) | Dr. Y. Tadmor (ARO) and Prof. H. Abeliovich, (Faculty of Agriculture, Rehovot) |
| 2013 | Mr. E. Ophir | Testing the potential of developmental recessive mutations to confer heterosis in melon hybrids | Prof. D. Zamir (Faculty of Agriculture, Rehovot) |
| 2013 | \*Mr. L. Shemesh | Identification of genes involved in chlorophyll biogenesis in melon fruits | Dr. N. Katzir (ARO) and S. Wolf (Faculty of Agriculture, Rehovot) |
| 2014 | \* Mr. I. Oz | *superfruiter* – agricultural and genetic evaluation of a new melon type | Dr Y. Tadmor (ARO) and Prof. Y Eliknd (Faculty of Agriculture, Rehovot) |

\*under my direct supervision

1. Guidance of Ph.D. Students:

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| **Graduation date** | **Name** | **Title of thesis** | **Guidance with** |
| 2014 | \* Dr. E. Shimoni-Shor | Genetic regulation of carotenoids over-accumulation in melon fruit | Dr. Y. Tadmor (ARO) and Prof. S. Gepsein (Technion) |
| 2016 | \* Dr. N. Chayut | Characterization of the Orange gene regulatory network in *Cucumis melo* for carotenoid biofortification in food crops | Dr. Y. Tadmor (ARO) and Prof. S. Gepstein (Technion) |

\*under my direct supervision

1. Post-Docs and Visiting Scientists:

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| **Dates** | **Name** | **Research subject** |
| 2008-2010 | Dr. A. Unes | Physiological and genetic studies of insulin content in bitter melon (Mmordica charantia L.) |

1. **Activity in Scientific and Agricultural Committees**
2. International:

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| **Dates** | **Description and role** |
| 2000 | Organization Committee of the VIIth Eucarpia Meeting on Cucurbit Genetics and Breeding, CUCURBITACEAE 2000: Member. |

1. National:

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| **Dates** | **Description and role** |
| 1994 to date | Cucurbit Steering Committee, Agricultural Extension Service, Israel Ministry of Agriculture; Member. |

1. **Contribution to the Scientific Community**
2. International:

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| **Dates** | **Description** |

1. National:

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| **Dates** | **Description** |
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1. Editorial responsibilities:

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| **Dates** | **Description** |
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1. Active Participation in Meetings
2. International:

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| --- | --- | --- | --- |
| **Date** | **Title of the Meeting** | **Place** | **Role** |
| 1990 | International Workshop on Carbon Economy of Fruits. | Bonn, Germany | Participant |
| 1990 | International Conference on Phloem Transport and Assimilate Compartmentation | Congnac, France | Poster |
| 1996 | *Cucurbit*s Towards 2000, the 6th Eucarpia Meeting on Cucurbit Genetics and Breeding. | Málaga, Spain. | Poster |
| 1998 | Cucurbitaceae ’98: Evaluation and Enhancement of *Cucurbit* Germplasm. | Pacific Grove, CA USA | Poster |
| 2000 | Cucurbitaceae 2000, the 7th Eucarpia Meeting on Cucurbit Genetics and Breeding. | Ma’ale Ha Hamisha, Israel. | Participant |
| 2002 | Cucurbitaceae 2002. | Naples, FL USA | Posters |
| 2008 | Fruit logistica 2008 | Berlin, Germany | Participant |
| 2008 | Cucurbitaceae 2008, the 9th Eucarpia Meeting on Cucurbit Genetics and Breeding. | Avignon, France | Poster |
| 2008 | META-PHOR meeting, EU plant metabolomics project (FOOD-CT-2006-036220). | Golmn, Germany | Participant |
| 2009 | META-PHOR meeting, EU plant metabolomics project (FOOD-CT-2006-036220). | Jerusalem, Israel | Participant |
| 2009 | Fruit logistica 2009 | Berlin, Germany | Participant |
| 2010 | META-PHOR meeting, EU plant metabolomics project (FOOD-CT-2006-036220). | Copenhagen, Denemark | Participant |
| 2010 | Fruit logistica 2010 | Berlin, Germany | Participant |
| 2010 | Cucurbitaceae 2010 | Charleston, SC, USA | Participant |
| 2011 | Fruit logistica 2011 | Berlin, Germany | Participant |
| 2012 | Fruit logistica 2012 | Berlin, Germany | Participant |

1. National:

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| **Date** | **Title of the Meeting** | | | **Role** | |
| 2012 | | Annual meeting of melon R&D leaders of Harris, Suttons and Hazera Genetics seed companies, | Berorim, Israel. | | Oral presentation | |

1. **Research Grants**
2. International Competitive Grants:

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| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Granting Source** | **Duration (years)** | **Role\*** | **Title (short)** | **Budget (US $ / year)** | |
| **Total** | **Researcher** |
| 1994 | BARD | 3 | CI | Aspects of sugar metabolism in Melon fruit as determinants of fruit quality. | 100,000 | 5,000 |
| 2002 | BARD | 3 | CI | Genomic approach to the improvement of fruit quality in melon (Cucumis melo) and related cucurbits crops | 100,000 | 5,000 |
| 2006 | BARD | 3 | CI | Genomic approach to the improvement of fruit quality in melon (*Cucumis melo*) and related cucurbit crops II: Functional Genomics**.** | 100,000 | 5,000 |
| 2006 | European Community Grant | 3 | CI | META-PHOR | 110,000 | 22,000 |
| 2011 | BARD | 3 | LPI | Characterization of the Or regulatory network in melon for carotenoid biofortification in food crops | 110,000 | 55.000 |
| 2012 | European Community Grant | 3 | CI | Comprehensive Approach to Enhance Quality and Safety of Ready to Eat Fresh Products (QUAFETY) . | 110,000 | 5,000 |
| 2013 | ISF-NSF | 3 | CI | Comparative genomic and genetic analyses of sugar metabolism and accumulation in watermelon and melon fruit | 200,000 | 10,000 |
| 2016 | BARD | 3 | CI | Characterization of the Or regulatory network for carotenoid biofortification in food crops - phase II | 90,000 | 5,000 |
| 2016 | BARD | 3 | CI | Characterization of genetic variation and yield heterosis in Cucumis melo | 90,000 | 5,000 |

\*PI = Principal Investigator; LPI =Local Principal Investigator; CI = Cooperating Investigator

1. National Competitive Grants:

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Granting Source** | **Duration (years)** | **Role\*** | **Title (short)** | **Budget (US $ / year)** | | |
| **Total** | **Researcher** | |
| 1991 | Chief Sci. Agriculture | 3 | PI | Breeding melon adapted to greenhouse under intensive conditions. | 15,000 | 10,000 | |
| 1993 | Chief Sci. Agriculture | 3 | CI | Physiology, biochemistry and genetics of sugar metabolism in melon as a tool for the improvement of agrothechnology and the breeding of high quality melon varieties. | 15.000 | 7,000 | |
| 1993 | Chief Sci. Agriculture | 3 | CI | Manipulation of plant architecture and density as a means to increase yield of high quality winter greenhouse melons. | 15,000 | 7,000 | |
| 1994 | Chief Sci. Agriculture | 3 | CI | Organic acid accumulation in melons and the production of new types of sweet melons. | 15,000 | 7,000 | |
| 1995 | Chief Sci. Agriculture | 3 | CI | Breeding watermelons for seed cracking. | 10,000 | 5,000 | |
| 1997 | Chief Sci. Agriculture | 3 | PI | Breeding “Ananas” type melons, adapting to irrigation conditions. | 10,000 | 10,000 | |
| 1998 | Chief Sci. Agriculture | 3 | CI | New analytical technique for improvement the flavor and fragrance in commercial melon cultivars | 23,000 | 5,000 | |
| 1998 | Chief Sci. Agriculture | 3 | CI | Grafting of melon and watermelon plants on different cucurbita rootstocks for preventing of soil borne diseases | 20,000 | 2,000 | |
| 1998 | Chief Sci. Agriculture | 3 | CI | Organic acid accumulation in melons and the production of new types of sweet melons | 15,000 | 7,000 | |
| 1999 | Chief Sci. Agriculture | 3 | CI | Pollination fruit set and development in melons under limit of sub optimal temperature. | 23,000 | 10,000 | |
| 2001 | Chief Sci. Agriculture | 3 | CI | Improving fruit quality in cucurbit fruits through an understanding of starch metabolism. | 15,000 | 7,000 | |
| 2002 | Chief Sci. Agriculture | 3 | CI | Melon fruit as functional food | 25,000 | 10,000 | |
| 2002 | Director’s funds, ARO | 3 | CI | Cucurbit Quality Center | 125.000 | 25.000 | |
| 2002 | ISF | 3 | CI | Quality Components of Cucurbit Fruits | 190,000 | 45,000 | |
| 2003 | Chief Sci. Agriculture | 3 | CI | Genetic control of aroma and fruit quallity in melons. | 20,000 | 5,000 |
| 2004 | Chief Sci. Agriculture | 3 | PI | A study of the genetic and physiology of color-break in melons. | 33,000 | 15,000 |
| 2006 | Chief Sci. Agriculture | 3 | PI | Developing melon varieties with high nutritional value for fresh-cut industry. | 25,000 | 12,500 |
| 2006 | Chief Sci. Agriculture | 3 | CI | Development of new pigmentation system in the fruits of melon, pumpkin and watermelon | 40,000 | 20,000 |
| 2006 | MAGNET | 5 | CI | BIOTOV | 150,000 | 30,000 |
| 2008 | Chief Sci. Agriculture | 3 | PI | Genetic study of high pigments of melon flesh. |  |  |
| 2009 | Chief Sci. Agriculture | 3 | CI | Development of a new pigmentation system in the fruits of melon | 33,000 | 10,000 |
| 2009 | ISF | 3 | CI | Molecular control of organic acid metabolism and accumulation in Cucumis melo fruit. | 30,000 | 5,000 |
| 2011 | Chief Sci. Agriculture | 3 | CI | A melon plant that accumulates tetra-cis-lycopene as its major fruit pigment | 33,000 | 10,000 |
| 2012 | Chief Sci. Agriculture | 3 | CI | superfruiter - agricultural evaluation of a new melon type | 33,000 | 10,000 |
| 2014 | Chief Sci. Agriculture | 3 | CI | Novel varieties of *Momordica charantia* (bitter melon) for use in control of diabetes type II mellitus | 94,000 | 21,000 |
| 2015 | Chief Sci. Agriculture | 3 | CI | ‘Clean and right’ – genetics and breeding of new melon rind/flesh combinations | 42,000 | 21,000 |
| 2015 | Chief Sci. Agriculture | 3 | CI | Grafted watermelon project: Improving watermelon fruit quality by optimization of agrotechnology and by metabolomics aspects | 125,000 | 31,000 |
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\*PI = Principal Investigator; LPI =Local Principal Investigator; CI = Cooperating Investigator

1. Other Funds:

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| **Year** | **Granting Source** | **Duration (years)** | **Role\*** | **Title (short)** | **Budget (US $ / year)** | |
| **Total** | **Researcher** |
| 1990 | Marks and Spencer | 4 | PI | Biochemistry of sugar accumulation in melons | 12,500 | 12,500 |
| 1993 | Hazera Seed Company | 8 | PI | Breeding high-quality C-8 muskmelon. | 75,000 | 75,000 |
| 1993 | Hazera Seed Company | 6 | PI | Adapting Galia’ varieties for greenhouse conditions. | 75,000 | 75,000 |
| 1993 | Pioneer Seed Company | 6 | PI | Breeding Arava type varieties, resistance for fusaruim wilt disease. | 120,000 | 120,000 |
| 2001 | Nunhems seed company | 5 | PI | Breeding Arava type varieties, resistance for fusaruim wilt disease. | 115,000 | 115,000 |
| 2006 | Origene Seed Company | 5 | PI | Developing inbred lines: Green fleshed "Galia" type, cream fleshed "Ananas" type and orange fleshed "Charantias" type. | 102,000 | 102,000 |
| 2008-2015 | Royalties | 8 | PI | Melon varieties | 100,000 | 30,000 |
| 2009 | KeyGene, Holland | 2 | CI | Evaluation of EMS mutants in melon | 70,000 | 0 |
| 2010 | Coca-Cola | 3 | CI | Natural sweetness component in plants | 250,000 | 10,000 |
| 2014 | Origene Seed Company | 5 | PI | Developing inbred lines: Green fleshed "Galia" type, cream fleshed "Ananas" type and orange fleshed "Charantias" type. | 102,000 | 102,000 |
| 2014 | Llavors Horta S.L., Spain | 5 | PI | Breeding of Piel De Sapo Melon Hybrids | 56,000 | 28,000 |

\*PI = Principal Investigator; LPI =Local Principal Investigator; CI = Cooperating Investigator

##### Joseph Burger December, 2016

##### Part II: LIST OF PUBLICATIONS

Marks:

S Student, technician or post-doc under my supervision

\* Equal contribution

1. **Articles in Reviewed Journals**

1. Paris, H. S., Karchi, Z., Nerson, H. and **Burger, Y.** (1983).

Yield and yield quality in precoocious yellow zucchini cultivars.

HortScience 18:724-726. IF and Rank for this year are not available.

2. Paris, H.S., Nerson, H. Karchi, Z. and **Burger, Y.** (1985).

Inheritance of light pigmentation in squash.

J. Hered*.* 76: 305-306. IF and Rank for this year are not available.

3. Paris, H.S., Nerson, H. and **Burger,** **Y.** (1985).

Precocious PI 165561 and Precocious PI 165561 R pumpkin breeding lines.

HortScience20: 778-779. IF and Rank for this year are not available.

4. Paris, H.S., **Burger Y.,** Karchi Z.and Nerson H. (1985).

'Benning's Yellow Tint' summer squash.

HotrScience 20: 785-786. IF and Rank for this year are not available.

5. Paris, H.S., Nerson H. and **Burger, Y.** (1985).

Precocious Caserta summer squash breeding line.

HotrScience 20: 786. IF and Rank for this year are not available.

6. Paris, H.S., Nerson, H. and **Burger, Y.** (1987).

Leaf silvering of *Cucurbita*.

Canad. J. Plant Sci. 67: 593-598. IF and Rank for this year are not available.

7. Nerson, H., Paris, H.S., Edelstein, M., **Burger, Y.** and Karchi, Z. (1988).

Breeding pickling melons for a concentration yield.

HortScience 23: 136-138. IF and Rank for this year are not available.

8. Paris, H. S., Nerson, H., **Burger, Y.,** Edelstein, M., Karchi, Z., McCollum, T. G. and Cantliffe, D.J. (1988).

Synchrony of yield of melons as affected by plant type and density.

J. Hort. Sci. 63: 141-147. IF and Rank for this year are not available.

9. Paris, H.S., Cohen, S., **Burger, Y.** and Yoseph, R. (1988).

Single-gene resistance to zucchini yellow mosac virus in *Cucurbita moschata*.

Eyphytica 37: 27-29. IF and Rank for this year are not available.

10. **Burger, Y.,** Schwartz, A. and Paris, H.S. (1988).

Physiological and anatomical features of the silvering disorder of *Cucurbita.*

J. Hort. Sci. 63: 635-640. IF and Rank for this year are not available.

11. Paris, H.S., **Burger, Y.,** Nerson, H., Edelstien, M. and Karchi, Z. (1989).

Performance of two new hybrid muskmelons in Israel.

Ann. Appl. Biol. 114:170-171. IF and Rank for this year are not available.

12. Paris, H.S Schaffer, A.A., Ascarelli, I.M. and **Burger, Y.** (1989).

Heterozygosity of gene B and the carotenoid content *of Cucurbita pepo.*

Crop Res.29:11-18. IF and Rank for this year are not available.

13. Paris, H.S. and **Burger Y.** (1989).

Complementary genes for fruit striping in summer squash.

J. Hered. 80:490-493. IF and Rank for this year are not available.

14. Nerson, H., Cohen, R., Edelstien, M. and **Burger, Y.** (1989).

Paclobutrazol – a plant growth retardant for increasing yield and fruit quality in muskmelon.

J. Amer. Soc. Hort. Sci. 114 (5):762-766. IF and Rank for this year are not available.

15. **Burger, Y**. and Schaffer A.A. (1990).

Sucrose metabolism in mature fruit peduncles of *Cucumis melo* and *Cucumis sativus*.

In Recent Advance in Phloem Transport and Assimilate Compatmentation (Eds,. J.L. Bonnenmain et. Al.) Paris. IF and Rank are not available.

16. Nerson, H., **Burger, Y**. and Berdugo, R. (1994).

High plant density and irrigation increase watermelon yield growth for seed consumption.

Adv. Hort. Sci. 8: 101-105. IF and Rank are not available.

17. Cohen, R., Elkind, Y., **Burger, Y.,** Offenbach, R. and Nerson, H. (1996).

Variation in the response of melon genotype to sudden wilt.

Euphytica 87: 91-95. IF and Rank for this year are not available.

18. Nerson, H. and **Burger Y**. (1996).

Parental characteristics limit yield and quality of winter-grown Galia-type muskmelon.

J. Genet. & Breed.50: 61-66. IF and Rank are not available.

19. Edelstein, M. Cohen, R. **Burger, Y.** Shriber, S., Pivonia, S. and Shtienberg, D. (1999).

Integrated managment of sudden wilt in melons, caused by Monosporascus cannonballus, using grafting and reduced rates of methyl bromide.

Plant Dis.83:1142-1145. IF = 0.803; Plant Sciences, Rank 66/136

20. Shalit, M., Katzir, N., Tadmor, Y., Larkov, O., **Burger, Y**., Shalechet, F., Lastochkin, E., Ravid, U., Amar, O., Edelstein, M., Karchi, Z., and Lewinsohn, E. (2001)

Acetyl CoA: alcohol acetyl transferase activity and aroma formation in ripening melon fruits.

J. Agric. Food Chem. **49**: 794-799. IF = 1.576; Agriculture, multidisciplinary, 2/56

21. Cohen, R., Horev, C., **Burger, Y.,** Shriber, S., Hershenhoren, J., Katan, Y. and Edelstein, M. (2002).

Horticultural and pathological aspects of fusarium wilt management using grafted melons.

HortScience 37: 1069-1073. IF = 0.507; Horticulture, Rank 10/20

22. **Burger, Y.,** Yeselson, Y, Sa’ar, U., Katzir, N., Levin, I., Schaffer, A.A. (2002).

A Single Recessive Gene for Sucrose Accumulation in *Cucumis melo* Fruit.

J. Am. Soc. Hortic. Sci. 127: 938-943. IF = 0.906; Horticulture, Rank 6/20

23. **Burger, Y**., Katzir, N., Tzuri, G., Portnoy, V., Sa’ar, U., Shriber, S., Perl-Treves, R. and Choen, R. (2003).

Variation in the response of melon genotype to fusarium oxyspourm f.sp. melonis race 1 as determined by inoculation tests and by molecular markers.

Plant Pathology 52: 204-211. IF = 1.264; Plant Sciences, Rank 48/136

24. **Burger, Y.,** Sa’ar, U., Distelfeld, A., Katzir, N., Yeselson, Y, Shen, S. and Schaffer, A.A. (2003).

Developing of sweet melon (*Cucumis melo*) genotypes combinig high sucrose and organic acid content.

J. Am. Soc. Hortic. Sci. 128: 537-540. IF = 1.033; Horticulture, Rank 7/23

25. Edelstein, M. **Burger, Y**., Horev, C., Porat, A., Meir, A. and Cohen, R. (2004).

Assessing the effect of genetic and anatomic variation of *Cucurbita* rootstocks on vigor, survival and yield of grafted melons.

The J. of Hortic. Sci. and Biotec. 79: 370-374. IF and Rank are not available

26. Edelstien, M., Ben-Hur, M., Cohen, R., **Burger, Y**., and Ravina, I. (2005).

Boron and salinity effects on grafted and non-grafted melon plants.

Plant and Soil.269: 273-284. IF = 1.703; Plant Sciences, Rank 40/144

27. Cohen, R., **Burger, Y.,** Horev, C. Porat, A. and Edelstein, M. (2005).

Performance of Galia type melons grafted onto cucurbita rootstock in Monosporascus cannonballus – infested and disease-free soils.

Annals of Appl. Biol.146: 381-387. IF = 1.317; Agriculture. Multidisciplinary, Rank 3/31

28. Ibdah, M., Azulay, Y., Portnoy, V., Wasserman, B., Bar, E., Meir, A., **Burger, Y**., Hirschberg, J., Schaffer, A.A., Katzir, N., Tadmor, Y. and Lewinsohn, E. (2006).  
 Functional characterization of *CmCCD1*, a carotenoid cleavage dioxygenase from melon.  
 Phytochemistry 67:1579-1589. IF = 2.417; Plant Sciences, Rank 53/200

29. **Burger, Y**., Sa’ar, U., Paris, H.S., Lewinsohn, E., Katzir, N., Tadmor Y., and Schaffer, A.A. (2006).  
 Genetic variability for valuable fruit quality traits in *Cucumis melo*.  
 Israel J. Plant Sciences 54:233-242. IF = 0.437; Plant Sciences, Rank 188/200

30. Lotan-Pompan, Maya,   Cohen, R.,   Yarden, O., Portnoy, V.,  **Burger, Y.** and N. Katzir. (2007).

###### Trifluralin herbicide-induced resistance of melon to fusarium wilt involves expression of stress- and defense-related genes.

Mol. Plant pathol. 8: 9-22*.* IF = 3.385; Plant Sciences, Rank 17/152

31. **Burger, Y**. and Schaffer, A.A. (2007).

The contribution of sucrose metabolism enzymes to sucrose accumulation in *cucumis*.

J. Am. Soc. Hortic. Sci. 132:704-712. IF = 0.915; Horticulture, 8/22

**Publications since the previous promotion**

32. Tadmor, Y., Katzir, N., Meir, A., Yaniv-Yaakov A., Sa'ar, U., Baumkoler, F., Lavee, T., Lewinsohn, E., Schaffer, A., **Burger, J**. (2007).

Induced mutagenesis to augment the natural genetic variability of melon (Cucumis melo L.).

Israel J. Plant Sciences, 55: 159 – 169. IF = 0.295; Plant Sciences, Rank 136/152

33. Portnoy, V., Benyamini, Y., Bar, E., Harel-Beja, R., Gepstein, S., Giovannoni, J.J. Schaffer, A.A., **Burger, J.,** Tadmor, Y., Lewinsohn, E. and Katzir, N. (2008).

The molecular and biochemical basis for varietal variation in sesquiterpene content in melon (Cucumis melo L.) rinds.

Plant Molecular Biology 66:647-661. IF = 3.541; Plant Sciences, Rank 17/156.

34. Choen, R., **Burger, Y.,** Horev, C., Sa'ar, U. and Ravid, M. (2008).

Peat in the inoculation medium induced fusarium susceptibillty in melons.

Plant breeding 127:424-428. IF = 1.280; Plant Sciences, Rank 73/156

35. Gonda, I., Bar, E., Portnoy, V., Lev, S., **Burger, J**., Schaffer, A. A., Tadmor, Y., Gepstein, S., Giovannoni, J. J., Katzir, N. and Lewinsohn, E. (2010).

Branched-chain and aromatic amino acid catabolism into aroma volatiles in *Cucumis melo* L. fruit.

J. Exp. Bot. 61: 1111-1123. IF = 4.818; Biology, Rank 18/85

36. Ophir, R., Eshed, R., Harel-Beja, R., Tzuri, G., Portnoy, V., **Burger, Y.,** Uliel, S., Katzir N. and Sherman A. (2010).

High-throughput marker discovery in melon using a self-designed oligo microarray.

BMC Genomics 11:269. IF = 4.206, Genetics & Heredity, Rank 34/156

37. **Burger, Y**., Jonas-Levi, A., Gurski, A. Horev, C. Saar, U. and Cohen, R. (2010).

Variation in anti-fungal activity in extracts from *Momordica* plants

Israel J. Plant Sciences, 58:1-7. IF = 0.312; Plant Sciences, Rank 188/200

38. Edelstein, M., Oka, Yuji, **Burger, Y**., Eizenberg, H. and Cohen R. (2010).

Variation in the response of cucurbits to *Meloidogyne incognita* and *M. Javanica*.

Israel Journal of Plant Sciences 58:77-84. IF = 0.312; Plant Sciences, Rank 188/200

39. Tadmor, Y., **Burger, Y**., Yaakov, I., Feder, A., Libhaber, S. E., Portnoy, V., Meir, A., Tzuri, G., Sa'ar, U., Baumkoler, F., Rogachev, I., Aharoni, A., Abeliovich, H., Schaffer, A., Lewinsohn, E. and Katzir, N. (2010).

Genetics of Flavonoid, Carotenoid, and Chlorophyll Pigments in Melon Fruit Rinds.

J. Agric. Food Chem. 58:10722–10728. IF = 2.816; Agriculture, multidisciplinary, 2/56

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1. **Allowed Patents and Registered Cultivars**

**Patents**

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MELON PLANTS COMPRISING TETRA-CIS-LYCOPENE

EP Patent 2,538,770, 2013

US Patent US2012/ 0324597, 2012

2. Schaffer, A. A., Cohen, S., Burger, Y., Katzir, N.

ISOLATED POLYNUCLEOTIDES AND METHODS AND PLANTS USING SAME FOR REGULATING PLANT ACIDITY

US Patent US2013/0133106, 2013

**Registered cultivars**

1. Paris, H.S., Karchi, Z., Nerson, H., Lozner, D., **Burger, Y.**, Edelstein, M. and Govers, A. (1986).

**Summer squash - BAREQET.** A vigorous hybrid zucchini has intensely green fruits which are long, slender and very attractive with high fruit gloss.

1300 kg. seeds have been sold, at a price of $ 40,000. From these seeds 1300 ha have been sown, equaling an income from selling fruits of $ 5,000,000.

2. Paris, H.S., Karchi, Z., Nerson, H., Edelstein, M., **Burger, Y.,** Lozner, D. and Govers, A. (1986).

**Winter squash - GO-GETTI.** The first hybrid spaghetti squash, early ripening and having bush plants. The fruits are borne in the center of the plant and average slightly over one kilogram in weight. Exterior of the plant is bicolor, orange and green; the green fades when the fruit is ripe. The "spaghetti" is cream in color.

3. Paris, H.S., Karchi, Z., Nerson, H., **Burger, Y.,** Edelstein, M., Lozner, D. and Govers, A.. (1986).

**Winter squash - ORANGETTI.** An early ripening spaghetti squash having bush plants. The fruits are borne in the center of the plant and average one kilogram in weight. Fruit exterior is intense orange and the "spaghetti" is likewise intense orange, having 15 times more vitamin A than other spaghetti squash.

500 kg. seeds have been sold, at a price of $ 9,000. From these seeds 1300 ha have been sown, equaling an income from selling fruits of $ 187,000.

Seeds are still being sold in 2015.

4. Paris, H.S., Nerson, H., Karchi, Z., **Burger, Y.,** Lozner, D., Edelstein, M. and Govers, A. (1986).

**Summer squash - BENNING'S** **YELLOW TINT**. 'Benning's Yellow Tint' offers a solid light lemon yellow color in scallop squash. Other plant characteristics are just likeoriginal 'Benning's Green Tint' cultivar. Developed by the backcross method of breeding. Open pollinated.

5. Paris, H.S**., Burger, Y.,** Nerson, H., Edelstein, M. and Karchi, Z. (1989).

**Muskmelon - QALYA.** A Galia-type muskmelon having a concentrated yield and fruits which are 30% smaller than "Galia" - ideal for export. Suitable for once-over mechanical harvest.

6. **Burger, Y.,** Paris, H.S., Nerson, H. and Edelstein, M. (1990).

**Muskmelon - GALIT**. Closely resembles the 'Arava' cultivar but is even earlier and with

smaller fruits.

7. Paris, H.S., **Burger, Y.,** Nerson, H. and Edelstein, M. (1992).

**Summer squash - YARQONA**. A vegetable marrow-type summer squash having medium green color. Plants are much improved as compared with other vegetable marrow-type cultivars, as they are smaller, non-branching, more open, and less spiny. Excellent yielder.

8. Paris, H.S., **Burger, Y.,** Nerson, H., Edelstein, M**.** (1992).

**Summer squash - NOVA**. A scallop-type summer squash having bicolor fruits. Fruits are intensely yellow and green, being completely green under some environmental conditions. Fruits have a long, narrow peduncle, small blossom scar, and store well. As they have a deep-scallop shape they are ideal for stuffing. Plants are very small and recommended for high-density planting. Growth habit is open, foliage is smoother than other cultivars of this type.

9. **Burger, Y.,** Cohen, R., Karchi, Z. and Edelstein, M.(1994).

**Muskmelon – VELAR** (M 2017). Early ripening Arava-type with resistance to race 0, 1 and 2 of fusarium wilt and race 1 of powdery mildew. Well adapted to most production areas, for indoor and outdoor plantings.

80 kg of seeds have been sold at a price of $ 60,000. From these seeds 80 ha have been sown, equaling an income from selling fruits of $ 2,400,000.

10. **Burger, Y.,** Cohen, R., Karchi, Z. and Edelstein, M.(1994).

**Muskmelon – ROSAR** (M 2018). Late ripening Arava type with resistance to race 0, 1 and 2 of fusarium wilt and race 1 of powdery mildew.

11. **Burger, Y.,** Cohen, R., Karchi, Z. and Edelstein, M. (1995).

**Muskmelon – CAPRI** (M 2031). Arava type with resistance to race 1 of powdery mildew.Very early maturity variety with a concentrated set of netted fruit. The melons have good shelf life and good shipping quality.

200 kg of seeds have been sold at a price of 152,000 $. From these seeds 200 ha have been sown, equaling an income from selling fruits of 6,000,000 $.

**2007-2015, since the previous promotion,** 2,000,000 seeds (50 kg) have been sold, at a price of 105,000 $ which yielded 4,200 $ royalties for ARO. From these seeds 200 ha have been sown, equaling an income from selling fruits of 4,000,000 $.

Seeds are still being sold in 2015.

12. **Burger, Y.,** Cohen, R., Karchi, Z. and Edelstein, M.(1995).

**Muskmelon – OMEGA** (M5080). Arava type with resistance to race 0, 1 and 2 of fusariumwilt and race 1 and 2 of powdery mildew. Suitable for autumn season

447 kg of seeds have been sold at a price of $ 377,000. From these seeds 447 ha have been sown, equaling an income from selling fruits of $ 13,400,000.

**2007-2015, since the previous promotion,** 3,500,000 of seeds (87.5 kg) have been sold, at a price of 350,000 $ which yielded 14,000 $ royalties for ARO. From these seeds 3500 ha have been sown, equaling an income from selling fruits of 7,000,000 $.

Seeds are still being sold in 2015.

13. **Burger, Y.,** Cohen, R., Karchi, Z. and Edelstein, M.(1995).

**Muskmelon –CARUSU** (SXM 5093)**.** Early ripening Arava-type with resistance to race 0,1 and 2 of fusarium wilt and race 1 of powdery mildew. Uniform fruit size and set. Suitable for late spring and autumn production.

500 kg of seeds have been sold, at a price of $ 500,000. From these seeds 500 ha have been sown, equaling an income from selling fruits of $ 12,000,000.

**2007-2015, since the previous promotion,** 9,400,000 of seeds (235 kg) have been sold, at a price of 660,000 $ which yielded **26,400 $ royalties for ARO**. From these seeds 3500 ha have been sown, equaling an income from selling fruits of 18,000,000 $.

Seeds are still being sold in 2015.

14**. Burger, Y.,** Cohen, R., Sa’ar, U. Shreiber, S. and Edelstein, M.(1998).

**Muskmelon - NUN7760-KARERA.** (M7301)**.** Arava-type with resistance to race 0,1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Uniform fruit size and set. Suitable for late spring production.

350 kg of seeds have been sold, at a price of 140,000 $. From these seeds 350 ha have been sown, equaling an income from selling fruits of 10,500,000 $.

15**. Burger, Y.,** Cohen, R., Sa’ar, U. Shreiber, S. and Edelstein, M.(1998).

**Muskmelon -NUN7761** (M7302)**.** Early ripening Arava-type with resistance to race 0,1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Uniform fruit size and set. Suitable for late autumn production.

110 kg of seeds have been sold, at a price of 44,000 $. From these seeds 110 ha have been sown, equaling an income from selling fruits of 3,300,000 $.

16**. Burger, Y.,** Cohen, R., Sa’ar, U. Shreiber, S. and Edelstein, M.(1998).

**Muskmelon -NUN7762-MALIKA** (M7303). Early ripening Arava-type with resistance to races 0, 1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Uniform fruit size and set. Suitable for late autumn production.

500 kg seeds have been sold, at price of 1,000,000 $. From these seeds 500 ha have been sown, equaling an income from selling fruits of 7,500,000 $.

17. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2000).

AS077, Nader, Early ripening Ananas-type. Nice appearance and skin color. Sweet and tasty fruits. 150 kg (6,000,000 Seeds), have been sold and 1,200 hectares have been sown.

18. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2001).

ANN064, Amira, Real Gold. Early ripening Ananas-type. Small fruits, nice appearance and skin color. Sweet and tasty fruits. Resistance to race 0 and 1 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions. 800 kg (32,000,000 Seeds), have been sold and 6400 hectares have been sown.

**2007-2015, since the previous promotion,** 23,147,800 of seeds (578 kg) have been sold, at a price of 452,000 $ which yielded **27,000 $ royalties for ARO**. From these seeds 2,300 ha have been sown, equaling an income from selling fruits of 15,000,000$.

Seeds are still being sold in 2015.

19. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2001).

ANN115, Constanta F1, Early ripening Ananas-type. Medium fruits, nice appearance and skin color. Sweet and tasty fruits. Resistance to race 0 and 1 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions. 100 kg (4,000,000 Seeds) have been sold 800 hectares have been sown.

20. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2002).

ANN150, NUN 5500 Me, Delano, Early ripening Ananas-type. Medium fruits, nice appearance and skin color. Sweet and tasty fruits. Resistance to race 0, 1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions. 300 kg, 12,000,000 Seeds, have been sold, 1200 hectares have been sown.

**2007-2015, since the previous promotion,** 25,280,000 of seeds (632 kg) have been sold, at a price of 843,000 $ which yielded **50,580 $ royalties for ARO**. From these seeds 2,500 ha have been sown, equaling an income from selling fruits of 18,000,000$.

Seeds are still being sold in 2015.

21. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2002).

ANN153, Scuba. Early ripening Ananas-type. Medium fruits, nice appearance and skin color. Sweet and tasty fruits. Resistance to race 0, 1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions.

**2007-2015, since the previous promotion,** 44,318,500 of seeds (1,107 kg) have been sold, at a price of 923,000 $ which yielded **55,380 $ royalties for ARO**. From these seeds 4,430 ha have been sown, equaling an income from selling fruits of 25,000,000$.

In 2015, 15,000,000 seeds have been sold, 17,000 $ royalties was received to ARO this year.

22. **Burger, Y.,** Cohen, R., Sa’ar, U. and Edelstein, M.(2002).

FH813, NUN5553,URI, 2002. Galia-type melon, high sugars content and long shelf life fruits. New market type. 50kg, 2,000,000 Seeds, have been sold, 100 hectares have been sown.

23. **Burger, Y.,** Cohen, R., Sa’ar,U. and Edelstein, M.(2003).

I210, NUN 3574 Me, Tereza. New market class melon, combination between Galia and Honey Dew. For unique market. 50 kg, 2,000,000 Seeds, have been sold , 100 hectares have been sown.

24. **Burger, Y.,** Cohen, R., Sa’ar,U. and Edelstein, M.(2004).

FH1583, NUN6529, Waller. Arava-type with resistance to race 0,1 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Uniform fruit size and set. Suitable for late spring production. 25 KG, 1,000,000 Seeds, have been sold, 50 hectares have been sown.

**2007-2015, since the previous promotion,** 21,783,400 of seeds (545 kg) have been sold, at a price of 867,500 $ which yielded **35,900 $ royalties for ARO**. From these seeds 4,430 ha have been sown, equaling an income from selling fruits of 12,000,000$.

In 2015, 9,000,000 seeds were selling, 12,000 $ royalties was received to ARO this year.

25. **Burger, Y.,** Cohen, R., Sa’ar,U. and Edelstein, M.(2005).

NUN6538-ANN184**.** Ananas-type. Medium fruits, nice appearance and skin color, good netting. Sweet and tasty fruits. Resistance to race 0, 1 and 2of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions.

**Varieties released since previous promotion**

26. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2007).

NUN8583-FH2273, Yelogal. Galia-type melon, high sugars content and long shelf life fruits, dense netting. New market type. Resistance to race 0, 1 and 2of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the CentraAmerica regions. This variety was selling in large amount in Brazil in the years 2008-2015.

**2007-2015,** 15,733,600 of seeds (393 kg.) have been sold, at a price of 1,830,600 $ which yielded **73,500 $ royalties for ARO**. From these seeds 1,573 ha have been sown, equaling an income from selling fruits of 30,000,000$.

27. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2007).

NUN8530-FH2272, Amergal. Galia-type melon, high sugars content and long shelf life fruits, density netting. New market type. Resistance to race 0, 1 and 2of fusarium wilt and race 1 and 2 of powdery mildew.

**2007-2015,** 83,197,200 of seeds (2,080 kg.) have been sold, at a price of 10,831,600 $ which yielded **434,500 $ royalties for ARO**. From these seeds 8,300 ha have been sown, equaling an income from selling fruits of 160,000,000$.

In 2015: 7,000,000 seeds were selling, 35,000 $ royalties was received to ARO this year. <http://ftp.freshinfo.com/eurofruit/article/16350/nunhems-celebrates-amaregal-anniversary>

28. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2007).

NUN8562-ANN310, Melody, Jaguar. Ananas-type. Medium fruits, nice appearance and skin color, dense netting, orange flesh. Sweet and tasty fruits. Resistance to race 0 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions.

**2007-2015,** 49,611,500 of seeds (1,240 kg) have been sold, at a price of 1,212,500 $ which yielded **72,750 $ royalties for ARO**. From these seeds 4,960 ha have been sown, equaling an income from selling fruits of 25,000,000$.

In 2015: 15,000,000 seeds were selling, 20,000 $ royalties was received to ARO this year.

29. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2007).

NUN8561-ANN311, Melanie. Ananas-type. Medium fruits, nice appearance and skin color, dense netting, orange flesh. Sweet and tasty fruits. Resistance to race 0 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions.

**2014-2015,** 2,488,000 of seeds (62 kg) have been sold, at a price of 61,400 $ which yielded 3,600 $ royalties for ARO. From these seeds 248 ha have been sown, equaling an income from selling fruits of 1,000,000$.

30. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2009).

Glory, Galia-type melon, high sugars content and long shelf life fruits, dense netting. Resistance to race 0, 1 and 2of fusarium wilt and race 1 and 2 of powdery mildew. This is the essential variety grown in the 'Arava' valley for local market and export at the autumn session, about 100 hectare per year. Suitable to the Central America regions.

Seeds are still being sold in 2015.

31. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2009).

Uriel, Charente's-type variety, yellow and netted skin, orange flesh. Grown for special market in Israel and Europe.

Seeds are still being sold in 2015.

32. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2009).

Shira, Galia-type melon, high sugars and good flavor. Grown in greenhouse in Israel and Europe.

Seeds are still being sold in 2015.

33. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2009).

Mayan. Galia-type melon, high sugars and good flavor, green flesh. Grown in greenhouse in Israel and Europe.

34. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2010) Gaya, Galia-type melon, high sugars and good flavor, green flesh. Grown in greenhouse in Israel, Morocco and Europe.

Seeds are still being sold in 2015.

35. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2011).

Gavriel, Charente's-type variety, yellow and netted skin, orange flesh. Grown for special market in Israel and Europe.

Seeds are still being sold in 2015.

36. **Burger, Y.,** Sa’ar,U. and Bomkeler, F.(2012).

Hallwah, Janna. Ananas-type. Medium fruits, nice appearance and skin color, dense netting, orange flesh. Sweet and tasty fruits. Resistance to race 0 and 2 of fusarium wilt and race 1 and 2 of powdery mildew. Suitable to the Mediterranean Sea regions.

**2012-2015,** 18,564,000 of seeds (464 kg) have been sold, at a price of 490,000 $ which yielded **27,300 $ royalties for ARO**. From these seeds 1,856 ha have been sown, equaling an income from selling fruits of 1,000,000$.

In 2015: 12,000,000 seeds were selling, 15,000 $ royalties was received to ARO this year.

37. **Burger, Y**., Sa’ar,U., Bomkeler, F. and Ohali, S. (2014).

Justin, Galia-type melon, high sugars content and long shelf life fruits, dense netting. Orange flesh with unique flavor. Resistance to race 0, 1 and 2of fusarium wilt and race 1 and 2 of powdery mildew.

2015: starting to be commercial.

**Joseph Burger December, 2016**

Part III: DESCRIPTION OF MAJOR ACHIEVEMENTS

Since joining the A.R.O. in 1981, I have devoted myself to research into the genetics and physiology of economically important traits of cucurbit crops, especially melon. My focus has been the breeding of improved cultivars and research supportive of breeding, focusing on components of fruit quality and encompassing the disciplines of classical genetics, fruit biochemistry, crop physiology, phytopathology and in the last ten years molecular genetics. I have approached the breeding and the research simultaneously, and the experience acquired in the former and the discoveries made in latter have complemented one another.

1. **Contribution to Agricultural and/or Environmental Sciences**

I have studied the genetics and biochemistry of sucrose accumulation in melon fruit and showed that sucrose is the major sugar that determines sweetness in melon. I studied the inheritance of sucrose accumulation in melon fruit and founded that the level of sucrose is controlled largely by a single recessive gene for high sucrose accumulation, which was designated *suc*. Studying the contribution of sucrose metabolism enzymes to sucrose accumulation in *Cucumis*, I revealed that the pattern of the decrease of acid invertase activity determines the sucrose level in melon (ref # 1-15, 1-22, 1-31; Hebrew reviewed # 4-2). These results were also exhibited in numerous international conferences (articles of symposia proceedings # 6-5, 6-7, 6-11, 6-14). This work was supported by funding from national and international competitive foundations, including BARD, the Israel Ministry of Agriculture and latest by ISF-NSF cooperation between Israel and Chania researchers. I developed the necessary segregating populations for mapping the sucrose accumulation trait in melon and studding the network genes that controlling this trait.

My studies of organic acid accumulation in the *Cucumis* germplasm identified novel melon accessions with unusually high acidity, but with low sugar levels. I developed the necessary segregating populations and showed not only that the trait is controlled by a single locus but also that high acidity can be combined with high sugar, leading to novel genotypes of sweet and sour melons, with a unique tropical fruit taste (reviewed no. 24). The prototype hybrids have been prepared and continuing research was carried out to identify the function of this important gene, based on the large recombinant populations I have developed. Mapping this trait was used with advance molecular systems (reviewed journal ref # 1-43, 1-47). Finally we identified the gene that control acidity in melon (reviewed journal, ref # 1-50).

The research subject in most cases arises from the field and the breeding programs. The main focus of my research activity during the last two decades has been on the quantitative analysis and the genetic control of melon fruit quality, as sucrose accumulation and melon fruit rind and flesh color.

Melon fruit flesh color could be white, green or orange. The difference between orange and non-orange fruit flesh is determined by a single gene, while orange is dominant. We have discovered a SNP in *CmOr*, the melon homolog to the cauliflower *Or* gene, that dominantly governs orange fruit flesh (ref #1-54). Based on the discovered polymorphism we developed a CAP marker that is now being utilized in our melon breeding programs. We showed that expression of *CmOr* with the ‘golden’ SNP, which changes a highly conserved Arginine in OR protein into a Histidine, can induce carotenoid accumulation in a heterologous system, indicating the biotechnology potential of our discovery for agricultural products -carotene biofortification (ref #1-54). We asked the question whether inducing the ‘golden’ SNP in other *Or* genes will result in a similar phenomenon and showed that inducing Arginine to Histidine mutation in the Arabidopsis or in the Sorghum *Or* genes significantly increased its capacity to induce carotenoid (mainly -carotene) accumulation in dark grown Arabidopsis callus (ref #1-55). This alteration is effective only at the ‘golden’ SNP location and changing other Arginine to Histidine in this area had no effect on the carotenoid accumulation induction capacity of the overexpressed *Or* gene. Moreover, changing the highly conserved Arginine into Alanine but not to Phenylalanine or to Lysine had similar effect than changing it to a Histidine (ref #1-55).

While studying ‘canary yellow’ melon fruit rind, we discovered a novel pigmentation system in melon that is based on flavonoids. Flavonoids accumulation in melon fruit rind is governed by a single gene however none of the structural genes of the flavonoids biosynthesis or regulation controls it (ref# 1-39). We utilized RNA-seq analysis of developing melon fruit rind of bulks of F3 families segregants combined with detailed metabolic analyses to identify an F-Box Kelch protein gene (*CmKBF*) whose allelic variation affects the metabolic flux toward flavonoids or towards coumarins and general phenylpropanoids (ref #1-57). We managed to show that transient over expression of *CmKBF* in melon leaves changed the metabolic flux as expected. Moreover, stable transformation of tomato with *CmKBF* also changed the metabolic flux validating *CmKBF* function and indicating its general possible regulating role in other plants too (ref #1-57).

Recently, we used BSR-Seq to study the network of transcriptional changes that are associated with the ‘golden’ SNP (ref #1-54). Pooling together F3 families that share same fruit flesh color and thus the same *CmOr* allelic variation, normalized traits unrelated to *CmOr* allelic variation. RNA-seq analysis of developing fruit of these bulks enabled the identification of differentially expressed genes. These genes were clustered into functional groups. The relatively enriched functional groups were those involved in photosynthesis, RNA and protein regulation, and response to stress. The differentially expressed genes and the enriched processes identified are likely part of the regulatory or functional network of *CmOr* (ref #1-58). Our recent studies (ref #1-54 and 1-58) serve now as the base ground for our future work aimed towards better understanding the mode of action of CmOr gene in the mediation of carotenoid accumulation.

We attempted to augment the natural genetic variability of melon by EMS mutagenesis (ref #1-32). One of the mutant families segregated for a unique yellow-orange fruit flesh color. We called this mutant YOFI (*yellow orange flesh* I). Carotenoid analysis by HPLC indicated that this mutant accumulates pro-lycopene (7,9,9′,7′-*tetra*-*cis*-lycopene) as its major fruit pigment. We hypothesized that we managed to mutagenize the melon *carotenoid isomerase* (CRTISO). To test this assumption and to characterize the direct effect of the induced mutation on all carotenogenic genes and possibly on other genes we conducted RNA-Seq analysis of developing fruit of YOFI and its progenitor isogenic line ‘CEZ’. Results are summarized in ref #1-48 and in patent #7-1. In short, a non-sense mutation in CRTISO results in the accumulation of pro-lycopene in fruit and in petals. This mutation increases the accumulation of upstream carotenoids due to increase of their expression.

As the researcher responsible for developing the germplasm collection of melons I have collected over the past years an extensive world germplasm collection of *Cucumis melo*, which serves as the core infrastructure of the ARO Center for the Improvement of Cucurbit Fruit Quality, an interdisciplinary center of excellence established by the ARO in 2002 (invited review no. 6). This vast source of genetic variability is screened by a broad range of researchers in order to identify useful and unique quality traits, including taste, aroma and nutrient levels. The development of new genetic variability, by both genetic recombination and mutations has led to additional traits of value. In the framework of the Center, and based largely on the value of the novel germplasm infrastructure I developed, we have been recognized through extensive funding from competitive national and international research programs include, such as the Ministry of Science, Ministry of Industry and Commerce. I was also a partner in the EU project, MetaPhor, responsibe for the supply of novel, genetically characterized melon varieties for the establishment of protocols for determination of metabolites in agricultural produce. This international cooperation yielded publication in a new advance subject, Metabolomics (reviewed nos. 44, 45, 51). Additionally, The EU project, MetaPhor yielded interdisciplinary work with The study of this germplasm has led to characterization of genetic and physiologic aspects of fruit quality components like aroma, fruit color and shelf life which has been published in international journals and exhibited in numerous international conferences (reviewed no. 20, 28; articles of symposia proceedings nos. 6, 10, 15, 16, 17, 18, 19, 20).

As a melon breeder and in light of my exposure to and familiarity with melon diseases I have studied, with my colleagues, numerous phytopathology aspects in melons (reviewed no. 17, 21, 30, 34, 56, 59; invited review nos.1, 2; non reviewed nos. 47, 48, 49, 50 ; articles of symposia proceedings nos. 2, 4, 8). My expertise with *Cucumis melo* germplasm allowed for the development of molecular markers for selecting for fusarium resistance in melon, a major challenge in melon breeding (reviewed no. 23). Additionally, I am involved in research dealing with grafting to prevent soil borne diseases in melon (reviewed nos. 19, 21, 25, 26, 27, 38; Hebrew reviewed no. 3; non reviewed nos. 51, 52, 53, 54; articles of symposia proceedings nos. 9, 12, 13).

Research into improved cultural practices for summer squash led to the identification and first description in the English language of a serious disorder of this crop, leaf silvering, (reviewed publication nos. 6 and 10 and in non-reviewed publication nos. 3 and 7). Silvering, a potentially crop-devastating disorder in Israel has now been observed in many parts of the world, and thirty three articles published in English have been cited in publications by colleagues from several countries.

1. **Achievements in Applied Research**(Specifying major contribution to agriculture and/or the environment in Israel and abroad)

My major contributions to applied agriculture research include: 1. breeding elite melons hybrids growing in Israel and over the world, especial Center and South America, 2. creating segregating population for genetic studies, 3. supporting breeding programs with valuable tools and knowledge that improve breeding efficiency and 4.creating unique plant material that expand the targets of breeding programs.

GENERAL CONTRIBUTION TO AGRICULTURE

During the two last decades we have developed melon segregating population for genetic studies. These populations was create in a though to use them in the future, especially for studding melon fruit quality traits. Indeed, these populations were the fundamental genetic background for our researches in the last filthiness years.

My genetic studies yielded the identification of a set of genes that control fruit quality traits, mostly genes that affect fruit external and internal color (published and internal knowhow). Polymorphism in these genes enabled converting the causal genes into useful and informative DNA markers that are now being routinely used in our breeding programs, increasing efficiency of breeding and selection processes. Moreover, identification of the causal genes gives us a better understanding of the physiology of the desired traits leading to increased breeding capacities.

We have developed two mutation libraries in melon to induce new variation in melon (ref #1-32). This approach led to a commercial agreement with KeyGene (2009) and yielded a number of interesting mutants some of them have a commercialization potential, including:

YOFI – patent #1

YOFI creates a new and unique melon fruit color which can be introduced to all genetic backgrounds. Additionally, YOFI brings new health attribute to melon; pro-lycopene is a powerful antioxidant, similar to lycopene (all-*trans*-lycopene) but with increased bioavailability. YOFI can be utilized to tag new melon products and to diversify plates of fresh cut melon or fruit salads with new and unique color.

*superfruiter* - PCT Patent Application No. PCT/IL2015/050252

*sf* creates a new type of melon, a personal small and seedless melon. Since *sf* is controlled by a single gene for which we have a marker it is easy to introduce *sf* to any melon genetic background. Still, *sf* raises two major concerns that were yet to be solved: yield and reproduction.

In plant varieties with significantly reduced fruit size, yield is reduced. We analyzed the effect of *sf* on yield in various genetic backgrounds. We found that on the average *sf* reduces fruit size by third and induces a fivefold increase of fruit number. This means that, on the average, yield of a *sf* plant is increased by more than 60%. Moreover, in some of the analyzed segregants we found plants with 20-fold increase of fruit number indicating the potential of *sf* to increase yield by more than fivefold. In summary, *sf* increases yield in a mechanism yet to be explored. However, once a personal seedless melon will be accepted by the market it will not suffer from yield reduction.

Since *sf* is seedless it can’t be reproduced through seeds. In collaboration with HISHTIL (a leading Israeli plant nursery company) we tried to develop technologies to reproduce *sf* plants vegetatively from cuttings. However, efficiency was low indicating that this approach will not assist in the commercialization of this unique product. We are now using our *sf* marker to backcross this trait into elite germplasm of various fruit type. The final product is aimed to be *sf* plantlets that will be selected with the marker from the progeny of self-pollination of a heterozygotes (a quarter of the segregants) or from crosses of *sf* with the heterozygote (half of the segregants). We believe that the increase of plantlet price, resulted from applying the marker, selecting the desired plants and wasting the non-desired genotypes, will be compensated by the yield increase and by the attractiveness of *sf* fruit. We are now negotiating with potential investors while we continue to develop *sf* melon varieties.

SPECIFIC CONTRIBUTION TO AGRICULTURE

Most of my research programs arise from the field and the breeding programs and are mostly applicative. These yielded numerous (27) national research programs. Since my last promotion (2006) I succeeded to receive eight scientist grants, budgeted by the National Government Ministries, particularly by the Ministry of Agriculture (24), also by the Ministries of Science (2) and of Trade and Industry. The total budgets from these national sources have been over 3,600,000 $, of which the portion directed to my research has been over 500,000$. These projects have also led to 59 articles in Hebrew aimed towards the Israeli agricultural community.

To date, in addition to my research work, I am the only government employed melon breeder in the country. I have led joint research and development breeding projects with some of the major national and international seed companies, including "H'azera Genetics", "Pioneer", "Nunhems" , "Origine" and finally with "Llavors Horta" S.L., Spain. In the frame of contracts between ARO and these companies, I received budget about 4,000,000 $ of which the portion directed to my research has been over 3,500,000$. As part of these projects I developed over 20 varieties registered in Israel, Central America and Europe. Most of the varieties are commercially grown in Europe, Central America and Israel, accounting for approximately 1,000,000 $ in royalties to the ARO in the last ten years.

Since taking on responsibility for the melon breeding projects, with the retirement of my mentor, Dr. Zvi Karchi, I have been conducting national and international research and breeding programs supported by a budget of about 4,000,000 $. The main financial support for the Cucurbit unit of the Neve Ya'ar Research Cnter, comes from these breeding contracts and the accompanied research programs, which enables us to employ seven research assistants and to conduct diverse research projects.

Among the characteristics that I have bred for and improved, while working with melons, watermelons, squash and pumpkins, are improved appearance and fruit quality, increased provitamin A content, increased shelf life, improved plant architecture, and adaptation to reductions in inputs of land area, fertilization and irrigation. I have bred and released a number of hybrids to private sources as well as breeding lines to the general public.

The melon growing season in Israel was originally limited to the summer months. In 1991 I started a research and breeding program with the aim of spreading the melon growing season to include the winter season with its high value export crop. Varieties which I developed contributed to the extension of the growing season and presently melon is being grown in Israel almost throughout the year.

For example, "Capri" was one of the first large scale commercial melon varieties I bred. This variety is a general "Galia" type melon adapted to greenhouse growing conditions. This variety was the leader in winter season grown in the "Arava valley".

Following this I bred the "Galia" type varieties "Omega", "Malika", "Waller" and "Karusu" or "Pollen". The two first varieties was adapted to the fall season and were the main varieties grown in this season in the "Arava valley" and "Ramat HaNegev", in the southern areas of Israel. The third one was the main variety grown in greenhouses in Turkey. These four varieties contained improved resistance to Fusarium disease and adapted for several growing conditions.

In addition to the "Galia" type I bred "Ananas" type melon varieties, adapted to the Mediterranean climate. "Nader" and "Amira" were the first "Ananas" type varieties I bred that become large scale commercial, mainly in Jordan. Later I bred the variety "Delano" and "Scuba" that is an important "Ananas" type melon grown in the north of Israel. Those two varieties are grown in a big scale during 2015 in the east of the Mediterranean Sea and yielded about 20,000$ royalties this year. In the last ten years I developed Ananas type melon varieties with orange flesh that enriched with  carotene, "Melanie", "Jaguar"/"Melody", "Hallwah"/"Janna", those three varieties yielded about 100,000$ royalties for the ARO from seeds sells since 2007, my last promotion.

Recently, my breeding and research projects have been concentrated on the improvement of fruit quality characteristics in order to combine two conflicting traits, shelf life and fine taste. "Uri" is the first variety from these programs, grown in Israel for the high quality market. Progressive varieties "Amergal", "Yelogal" and "Glory" have been introduced to Central American countries. The varieties "Amegal" and "Yeloga"l yielded about 450,000$ royalties for the ARO from seeds sells since 2007, my last promotion. The variety "Glory" is the leader variety in fall season grown in the "Arava valley" in the last four years and its grown in big scale in Center and South America.

As a part of the cucurbits breeding unit, I was a partner with Dr. Harry Paris, in breeding new squash varieties with high economic value. ‘Bareqet’, a green-fruited, zucchini squash (non-reviewed no. 19) is grown in Israel for the hotel trade and in the organic farming sector, and ‘Bareqet’ is the leading variety for export and further I was partner in breeding yellow summer squash, "Goldy". Those hybrids has relatively small plants and open growth habit, heritable characteristics which allow for close spacing and high yields per unit area, as described to Israeli farmers (non-reviewed no. 22). Those two varieties were still selling during 2015. ‘Orangetti’, together with ‘Go-Getti’, were the first hybrid spaghetti squash (non-reviewed no. 17). It was recognized as having improved flavor and a new, more attractive color than the old, light yellow spaghetti squash, as well as 15-fold as much provitamin A (ref # 1-12).