NATIV DUDAI December 2017

**CURRICULUM VITAE**

# **Personal**

1957 Born in Kefar Yehezqel, Israel.

1971-1975 High School education in Nir Ha'Emeq, 'Afula.

Marital Status: Married + 4

# **University Education and additional training**

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| 1980-1983  | B. Sc. Faculty of Agriculture, The Hebrew University of Jerusalem, Rehovot, Israel.  |
| 1980-1983  | M. Sc. Faculty of Agriculture, The Hebrew University of Jerusalem, Rehovot, Israel.Title of thesis: “Environmental Factors effecting Flowering Morphology and Essential Oil of Origanum syriacum”. Supervision: Prof. A. H. Halevy and Prof. D. Palevitch.  |
| 1992-1998 | Ph.D., Faculty of Science and Mathematics, The Hebrew University of Jerusalem, Israel. Title of Thesis: “Essential Oils as Germination and Growth Inhibitors”.Supervision: Prof. A.M. Mayer, Dr. H. Lerner, (Faculty of Science and Mathematics, The Hebrew University of Jerusalem) and Dr. E. Putievsky (Newe Ya'ar, A.R.O). |
| 2006-2007 | Sabbatical leave at The Biothech Center – Rutgers University NJ USA, Host: Prof. Faith Belanger. Research subjects: Using molecular biology methods to isolate and express OMT genes from vanilla and using the AFLP method to identify polymorphism and genetic markers in sweet basil varieties |
| 2013-2014 | Sabbatical leave at The Center of Agricultural Experimentation and Assistance, Albenga, Italy. Host- Dr. Andrea Minuto and Dr. Gionanni Monuto. Research subjects: Sweet basil breeding and the effect of light on yield and quality parameters. |

**Positions Held and Academic Status:**

1980-1983 Herb grower in Kefar Yehezqel, Israel.

1983-2000 Research Engineer at the Aromatic and Medicinal Plants

 Unit, Agricultural Research Organization (ARO), the

 Newe Ya'ar Research Center,.

2000 – to date Research Scientist, Head of the Unit of Aromatic and Medicinal Plants,

 ARO, Newe Ya'ar Research Center.

2005 Promoted to Senior Research Scientist (Rank A).

2012 Promoted to Principal Research Scientist (Rank A+).

2013 –to date Member of the Newe Ya'ar Research Center Board.

2016 –to date Scientific director of Emek Hama'ayanot R&D center.

**Teaching and Training Experience**

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| 2003 – to date  | Lecturer and Associate Professor at the Robert H. Smith Faculty of Agriculture and Environment, Undergraduate Course, "The Biology and Physiology of Production of Aromatic and Medicinal Plants" # 71339  |

**Student Supervision:**

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| 2002 - 2004  | Mr. I. Shamay, M.Sc. Student,“ Use of non-chemical means for management of gray mold in sweet basil”. Guidance with Prof. D. Steinberg. |
| 2004 - 2007  | Ms. R. Fisher, M.Sc. Student. Developmental factors affecting aroma of sweet basil. Guidance with Prof. B. Rubin. |
| 2003 - 2004 | Mr. D. Segev, M.Sc. Student. “Chemical variability between and within wild populations of mint in Israel”. Guidance with Prof. A. Eshel, Tel Aviv University. |
| 2004 – 2006 | Mrs. E. Shafran, M.Sc. Student. “Physiology of sensitivity of sweet basil to low temperatures”. Guidance with Prof. A.M. Mayer, Hebrew University of Jerusalem. |
| 2004 - 2006 | Mr. A. Barr, M.Sc. Student. “Characterization of the biological and the phytochemical profile of *Nepeta* sp. in Israel". Guidance with Prof. J. Kigel. |
| 2005 - 2007  | Mr. M. Serfati, M.Sc. Graduate Student. “Introduction of stevia to Israel”. Guidance with Prof. Y. Saranga. |
| 2005 - 2006  | Mr. Y. Bleicher, M.Sc. Student. “Potential of *Salvia Sclarea* L. seed production as a source for oil rich with essential Omega-3 fatty acids and effect of developmental and agrotechnical factors on the oil accumulation and composition”. Guidance with Prof. R. Reiffen. |
| 2005 - 2007  | Mr. R. Krizevsky, M.Sc. Student. “Alkaloids biosynthesys in *Catha edulis*”. Guidance with Dr. E. Lewinsohn. |
| 2006 - 2007  | Mr. Roi Hagai M.Sc. Student. “Genetic and environmental factors affecting sensitivity of sweet basil to Botrytis blight”. Guidance with Prof. Y. Elad. |
| 2006 - 2008  | Mr. Dror Kaldes M.Sc. Student. “Factors affecting on canosic acid accumulation in rosemary”. Guidance with Prof. Y. Saranga. |
| 2006 - 2008  | Miss Hila Tamir, M.Sc. Student. “A study of the ecotypes and chemical conents of *Varthemia iphionoides* in Israel”. Guidance with Prof. J. Kigel. |
| 2006 - 2009  | Mr. Itay Rabinivich, M.Sc. Student. “Flowering control in chives (*Allium schoenoprasum*)”. Guidance with Prof. R. Kaminetzky and Prof. H. Rabinovich. |
| 2008 - 2014 | Mr. David Chaimovitsh, Ph.D. student. “Inhibition of seed germination by essential oil – the mode of action”. Guidance with Dr. E. Sadot and Prof. B. Rubin. |
| 2008 - 2009 | Dr. Joseph Dib (MD), Junior doctor research work for the Israeli Medical Association. "Sensitivity of Streptococcus A to selected aromatic plants extraction and essential oil". Guidance with Dr. R. Colodner, Haemek Hospital, Afula, Israel. |
| 2008 - 2009  | Miss Hannah Oduro, M.Sc. Student. “The effect of temperature and day length on the concentration of fatty acid and oxalic acid in leaves of Portulaca oleracea: Effect of oral administration of these leaves on acute inflammation in Dextran Sulphate Sodium (DSS)-induced experimental colitis.”Guidance with Dr. O. Barazani and Prof. B. Schwartz.  |
| 2009 - 2010  | Dr. Tyassir Beshara (MD), Junior doctor research work for the Israeli Medical Association. "Application in vivo of selected aromatic plants extraction and essential oil formulations against Streptococcus A". Guidance with Dr. J. Rakover, Haemek Hospital, Afula, Israel. |
| 2009 - 2010  | Mrs. Avital Yosef Friedjung, M.Sc. Student. “The cultivation of medicinal desert plants.” Guidance with Dr. S. Rachmilevitch. |
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| 2011 - 2013  | Mrs. Osnat Altshuler, M.Sc. Student. "Screen of essential oils and monoterpenes targeted to the phytosceleton in animal cells". Guidance with Dr. E. Sadot.  |
| 2011 - 2013 | Mr. Omer Naharan, M.Sc. Student. "Using irradiation to reduce chilling damage to basil ". Guidance with Prof. J. Kigel. |
| 2012 - In progress | Mrs. Dganit Sade, Ph.D. student. “The influence of semiochemicals on the whitefly Bemisia tabaci “Guidance with Prof. M.Ghanaim |
| 2012-2014 | Mr. Itai Tsion, M.Sc. Student. "Using vetiver for fuel bioremediation”. Guidance with Prof. A. Haim and Dr. S. Shamir. |
| 2013-2015 | Mrs. Limor Gurkan, M.Sc. Student. "Human health benefits from the consumption of omega-3 fatty acids: fish sources vs. vegetal sources”. (MSc. project).  |
| 2016 - In progress | Mrs. Renana Milevsky, Ph.D. student. “Gene mapping of some resistance traits in sweet basil“ |

#  **Membership in Scientific and Agricultural Committees**

**A. Local:**

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| 1989 to date  | Professional Committee of Fresh Herb Crops, The Ministry of Agriculture. |
| 1999 to date  | Member of the Management Committee of Herb and Spice Crops, The Ministry of Agriculture.  |
| 2005 to 2009  | Scientific Committee of the Dead Sea R&D, The Ministry of Science.  |
| 2006 - 2007  | The Chief Scientist Steering Committee of New Crops.  |
| 2008-2013 | The Chief Scientist Research Proposal Evaluation Committee of Agricultural Development. |
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**B. International:**

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| 1993  | Organization Committee: “International Symposium on Medicinal and Aromatic Plants”, Tiberias, Israel. |
| 2003  | Organization Committee: “Vanilla 2003 - First International Congress”, Princeton, N.J.  |
| 2009  | Member of the BARD crop production panel. |
| 2009 – to date  | The Israeli representative in the MAP Working Group of the European Cooperative Programme of Plant Genetic Resources (ECPGR). |
| 2011 | Organization Committee: “Vanilla 2011 - 2nd International Congress”, Jamesburg, NJ, USA |

# **Editorial Responsibilities**

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| 2004 | Co- editor of the Proceedings of the Vanilla 2003 Symposium.  |
| 2005  | Co- editor of the Proceedings of the First International Symposium on Natural Preservatives in Food Systems. |
| 2006  | Editor of a section of Stewart Postharvest Review Journal - "Medicinal and Aromatic Plants" (Issue 4 August 2006). |
| 2008  | Co- editor of the Proceedings of the 2nd International Symposium on Natural Preservatives in Food Systems. |
| 2010  | Editor of the issue on Aromatic Plants of the Israel Journal of Plant Sciences. |
| 2013-to Date | Member of the editorial bord of the journal Evidence-Based Complementary and Alternative Medicine |
| 2013-to Date | Member of the editorial bord of Journal of Applied Research on Medicinal and Aromatic Plants |

# **Participation in International Meetings,**

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| 1993  | The International Symposium on Medicinal and Aromatic Plants, Tiberias, Israel (orgnizer and speaker). |
| 1996  | First World Congress on Allelopathy - A Science of the Future, Cadiz, Spain (poster). |
| 1996 | **(Invited lecture)** NORA 3rd International Symposium on Natural Oils, Tel Aviv, Israel. |
| 1997  | 28th International Symposium on Essential Oils, Eskishehir, Turkey (poster). |
| 1999  | VI International Workshop on Seed Germination, Merida, Mexico (speaker).  |
| 1999  | 4th International Conference on Postharvest Science - Jerusalem, Israel (poster). |
| 2000  | 2nd Inrernational Symposium on Breeding Research on Medicinal and Aromatic Plants, - Khania, Greece (speaker). |
| 2001 | World Conference on Medicinal and Aromatic Plants, Budapest, Hungary (speaker and a session chair). |
| 2002 | XXVI International Horticultural Congress and Exhibition “Horticulture: Art and Science for Life”, Toronto, Canada (2 posters).  |
| 2003 | All-America Selection Annual Meeting in California, USA (A new cultivar presenter). |
| 2004 | **(Invited lecture)** Vanilla 2004 international congress, Cannes, France (organizer, session chair). |
| 2004 |  **(Invited lecture)** Workshop on essential oils as an alternative pest control measure, Wageningen, The Netherlands. |
| 2005 | International Symposium on Natural Preservatives in Food Systems, Princeton, NJ, USA (organizer, session chair, poster).  |
| 2005 | **(Inviteded lecture)** Workshop on collaboration Israel-Kenya, Egerton University, Kenya. |
| 2005 | **(Inviteded lecture)** International symposium on the science of medicinal and aromatic plants, Nazareth, Israel (organizer, session chair). |
| 2006 | The Labiatae: Advances in Production, Biotechnology and Utilisation, Sanremo, Italy (Speaker). |
| 2006  | **(Inviteded lecture)** Israel-Germany Bi National Workshop on Aroma – a Key Quality Attribute in Plans, Bet Dagan, Israel . |
| 2006 | **(Invited lecture)** Jordan – Israel workshop on the science of medicinal and aromatic plants, Amman, Jordan.  |
| 2006 | **(Invited lecture)** International Symposium on Natural Preservatives in Food, Feed and cosmetics. Amsterdam, Holland (organizer, session chair).  |
| 2006  |  **(Invited lecture)** Vanilla - Science and Technology, Cook College, Rutgers University, New Brunswick NJ, USA. |
| 2007 | **(Invited lecture)** Novel and Sustainable Weed Management in Arid and Semi-Arid Agro Ecocsystems. Faculty of Agriculture, Rehovot, Israel. |
| 2008  | International symposium: Frontiers in Agriculture – Abiotic and Biotic Stress in Plants, Amman, Jordan (speaker and session chair).  |
| 2009 | International Symposium Breeding Research on Medicinal and Aromatic Plants, Ljubljana, Slovenia (speaker and session chair).  |
| 2009  | **(Invited lecture)** International Conference on Plants and Environmental Pollution, Kayseri, Turkey (session chair).  |
| 2009  | **(Invited Lecture)** Floods and Modern Methods of Control Measures, Tibilisi, Georgia (organizer, session chair). |
| 2009  | **(Invited)** Meeting of the MAP Working Group of the European Cooperative Programme of Plant Genetic Resources (ECPGR), Kusadasi, Turkey. |
| 2011 | (**Invited lecture**) International Symposium on Medicinal, Aromatic and Nutraceutical Plants from Mountainous Areas, Saas-Fee, Switzerland. |
| 2011 | **(Invited lecture)** Second International Seminar of Chinese Agricultural Sage Culture, Shouguang, China. |
| 2012 | **(Invited lecture)** International Symposium Breeding Research on Medicinal and Aromatic Plants, Vienna, Austria (scientific committee,). |
| 2012 | 43rd International Symposium on Essential Oils, Lisbon, Portugal (speaker). |
| 2012 | **(Plenary lecture)** International Symposium on Medicinal Plants and Natural products, Quito, Ecuador. |
| 2012 | **(Invited seminar)** Facultad de Ciencas Agrarias, Universidad Mayor, Sucre, Bolivia. |
| 2013 | **(Invited lecture)** International Symposium on Medicinal Plants and Natural products, Montreal, Canada (session chair). |
| 2014 | **(Invited seminar** and training) 4th Division, Xinjiang Production and Construction Corps, Yining, China. |
| 2014 | **(Invited lecture**) 6th Indian Horticulture Congress-2014, Coimbator, India. |
| 2016 | 6th International Congress on Medicinal and Aromatic Plants (CIPAM 2016), Lisbon, Portugal (Poster). |
| 2016 | International Symposium Breeding Research on Medicinal and Aromatic Plants, Quedlinburg, Germany (scientific committee, session chair). |
| 2016 | **(Invited seminar** and training) 69th Regiment, Xinjiang Production and Construction Corps, Yining, China (full coverage of expenses). |
| 2016 | **(Invited lecture)** "What is Natural 2016 Meeting" – a meeting on the biology and chemistry of natural food and natural additives, Jamesburg, NJ.  |
| 2017 | **(Invited lecture)** "Lamiaceae 2017" – Antalya, Turkey (scientific committee). |
| 2017 | **(Invited lecture)** "5th International Phytocosmetics and Phytotherapy Congress" (IPPC) – Patras, Greece (scientific committee). |
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**Invitation by Professional Societies in Israel**

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| 2000  | **(Invited lecture)** Genetic variation in wild populations as a source for the development of new aromatic crops in Israel. Plenary lecture at the annual Isr. Bot. Soc. Meeting, Bet Dagan.  |
| 2002  | **(Invited lecture)** Development of traditional endemic aromatic plants in Israel as new crops. Plenary lecture at the annual meeting of The Biblical Fruit Society of Israel, Bet Dagan. |
| 2003  | **(Invited lecture)** Introduction and preservation of endemic aromatic plants in Israel. Plenary lecture at the annual meeting of The Biblical Fruit Society of Israel, Newe Ya'ar.  |
| 2003  | **(Invited lecture)** New trends in the research and development of medicinal and aromatic plants. Plenary lecture at the annual meeting of The Israel Medicinal Plant Society, Newe Ya'ar. |
| 2005  | **(Invited lecture)** Collection, preservation and domestication of biblical herbs, spices and medicinal plants in Israel. Plenary lecture at the annual meeting of The Biblical Fruit Society of Israel, Eshta’ol. |
| 2006  | **(Invited lecture)** Feasibility of essential oil production in Israel. At the first meeting of the Essential Oils and Aromatherapy Society of Israel, Tel Aviv. |
| 2008  |  **(Invited lecture)** Aromatic plants, essential oils and all between. At the third meeting of the Essential Oils and Aromatherapy Society of Israel, Bet Dagan. |
| 2016 | **(Invited lecture)** Intoduction and development of medicinal and aromatic plants for their suitability for new applications in the food industry . At the 15 conference Food In the New Era, Ramat Gan. |

 **Membership in Professional Societies**

* + International Allelopathy Society
	+ The International Society for Horticultural Science (ISHS)
	+ American Phytopathological Society (APS)
	+ The Israel Botanical Society
	+ Israel Medicinal Plants Society (EILAM)
	+ Israel Essential Oils and Aromatherapy Society (honorary membership)
	+ The Israel Society of Ecology and Environmental Sciences

##### Research Grants

##### International Competitive Grants

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| 2002 | Cooperative Research Grant of the European Commission Grant. Title: Development of greenhouse foils and additives to optimize plant growth and disease inhibition through the control of photomorphogenesis, for 2 years. Total budget: $ 60,000/year. Cooperating investigator Researcher's part: $25,000/year. |
| 2002 | BARD Grant. Title: Functional genomics of citral biosynthesis in aromatic plants: Pathway elucidation and applications. Cooperating investigator, for 3 years. Total budget: $48,000/year. Researcher's part: $10,000/year. |
| 2002 | CDR –US-AID Grant. Title: Soil erosion control by narrow stripes of *Vetiveria* *zizanioides*. Cooperating Investigator, for 3 years. Total budget: $70,000 /year; Researcher’s part $/25,000 year. |
| 2003 | CDR –US-AID Grant. Title: Kenyan Plant Extracts for Biological Insect Control. Cooperating Investigator, for 4 years. Total budget: Total $50,000/year; Researcher’s part $10,000/year. |
| 2008 | BARD Grant. Title: Genetic linkage mapping of basil (*Ocimum* *basilicum*) a feasibility study. Israeli principal investigator, for 1 year. Total budget: $ 100,000. Researcher's part: $ 48,000. |
| 2014 | MERC Grant. Title: Feasibility of irrigation of aromatic plants by effluent water. Cooperating investigator, for 3 years. Total budget: $ 140,000. Researcher's part: $ 52,000. |

##### National Competitive Grants

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| 1993 | Chief Scientist of the Ministry of Agriculture Grant. Title: Improving the quality and quantity of yield of chives for the fresh herb market. Principal investigator, for 3 years. Total budget: $13,043/year. Researcher's part: $6000/year. |
| 1993 | Chief Scientist of the Ministry of Agriculture Grant. Title: Selection and cultivation of fresh herbs. Cooperating investigator, for 4 years. Total budget: $11,000/year. Researcher's part: $5,000/year.  |
| 1994 | Chief Scientist of the Ministry of Agriculture Grant. Title: Breeding and cultivation of fresh herbs. Cooperating investigator, for 3 years. Total budget: $41,219/year. Researcher's part: $13,740/year. |
| 1996 | Chief Scientist of the Ministry of Agriculture Grant. Title: Cultivation of fresh herbs. Cooperating investigator, for 1 year. Total budget: $41,219. Researcher's part: $14,000 |
| 1997  | Chief Scientist of the Ministry of Agriculture Grant. Title: The biochemistry of the production of linalol in basil, Cooperating investigator, for 3 years. Total budget: $60,000/year Researcher's part: $20,000/year. |
| 1998 | Chief Scientist of the Ministry of Agriculture Grant. Title: Breeding of unique basil varieties for export. Cooperating investigator, for 2 years. Total budget: $16,000/year. Researcher's part: $8,000/year.  |
| 1998 |  Chief Scientist of the Ministry of Agriculture Grant. Title: Examination of the potential use of modified atmosphere packaging, combined with application of essential oils, for storage of ornamental geophytes. Cooperating investigator, for 3 years. Total budget: $25,000/ year. Researcher's part: $5,000/year. |
| 1999 | Chief Scientist of the Ministry of Agriculture Grant. Title: The accumulation of pesticides in aromatic plants. Cooperating investigator, for 3 years. Total budget: $28,000/year Researcher's part: $10,000/year. |
| 1999 | Chief Scientist of the Ministry of Agriculture Grant. Title: Breeding of chives for the fresh herbs market. Principal investigator, for 3 years. Total budget: $15,000/year. Researcher's part: $15,000/year. |
| 2001 | Chief Scientist of the Ministry of Agriculture Grant. Title: Breeding of basil with tolerance for low temperatures for the fresh herbs market. Principal investigator, for 3 years. Total budget: $18,000/year. Researcher's part: $13,000/year. |
| 2001 | Chief Scientist of the Ministry of Agriculture Grant. Title: Introduction of flowering aromatic crops as new ornamental products. Principal investigator, for 3 years. Total budget: $13,000/year. Researcher's part: $10,000/year. |
| 2001 | Chief Scientist of the Ministry of Agriculture Grant. Title: Irrigation of aromatic plants by waste water. Principal investigator, for 3 years. Total budget: $24,000/year. Researcher's part: $16,000/year. |
| 2002 | Chief Scientist of the Ministry of Agriculture Grant. Title: Collection, preservation and chrecterization the biodiversity of aromatic plants. Principal investigator, for 2 years. Total budget: $20,000. Researcher's part: $20,000. |
| 2003 | Eva Erlich Gant. Title: Using essential oils for disinfestations of soilborn diseases. Principal investigator, for 2 years. Total budget: $35,000/year. Researcher's part: $25,000/year. |
| 2004 | Chief Scientist of the Ministry of Agriculture Grant. Title: Introduction of Stevia to Israel. Principal investigator, for 3 years. Total budget: $18,000/year. Researcher's part: $18,000/year. |
| 2004 | Science Ministry Grant. Title: A Study of the Ecotypes and Chemical Contents of *Varthemia iphionoides.* Principal investigator, for 3 years. Total budget: $30,000/year. Researcher's part: $17,000/year |
| 2004 | Science Ministry Grant. Title: Introduction and cultivation of local medicinal and aromatic plants and essential oil production as agro-tourism farming and establish educational center.Cooperation investigator, for 3 years. Total budget: $25,000/year. Researcher's part: $7,000/year |
| 2008 | Chief Scientist of the Ministry of Agriculture Grant. Title: Purslane (*Portulaca oleracea*) as an edible herb contains Omega 3 fatty acid. Principal investigator, for 3 years. Total budget: $20,000/year. Researcher's part: $10,000/year. |
| 2008 | Chief Scientist of the Ministry of Agriculture Grant and the Vegetable Growers' Association Grant. Title: Developmetal biology and factors affecting flowering of arugula (*Diplotaxis tenuifolia*). Principal investigator, for 3 years. Total budget: $25000/year. Researcher's part: $25,000/year. |
| 2011 | Chief Scientist of the Ministry of Agriculture Grant. Title: Reducing chilling damage of basil. Principal investigator, for 2 years. Total budget: $15,000/year. Researcher's part: $15,000/year. |
| 2011 | Chief Scientist of the Ministry of Agriculture Grant. Title: Characterization of resistance to *Sclerotinia sclerotiorum* in sweet basil. Principal investigator, for 2 years. Total budget: $15000/year. Researcher's part: $15,000/year. |
| 2012 | Chief Scientist of the Ministry of Agriculture Grant. Title: Vetiver for biomass production. Principal investigator, for 2 yeas. Total budget: $30,000/year. Researcher's part: $30,000/year. |
| 2012 | Chief Scientist of the Ministry of Agriculture Grant. Title: Diversity and selection of kenaf. Cooperating investigator , for 2 years. Total budget: $30,000/year. Researcher's part: $15,000/year. |
| 2012 | Chief Scientist of the Ministry of Agriculture Grant. Title: Development of automatic post harvest packaging machinery for fresh chives. Principal investigator, for 1 years. Total budget: $350,000. Researcher's part: $350,000/year. |
| 2014 | Gene Bank Chief Scientist Grant. Title: Metabolomic of *Origanum* Spp. from wild populations in Israel and living germplasm conservation. Principal investigator, for 1years. Total budget: $20,000. Researcher's part: $15,000/year. |
| 2015 | Chief Scientist of the Ministry of Agriculture Grant. Title: Feasibility study of sweet basil breeding for high temperatures resistance. Principal investigator, for 1year. Total budget: $35,000. Researcher's part: $35,000/year. |
| 2015 | Chief Scientist of the Ministry of Agriculture Grant. Title: Isolation and identification of antibacterial and anti-virulent compounds with therapeutic potential against *Helicobacter pylori*. Cooperating investigator, for 3 year. Total budget: $200,000. Researcher's part: $20,000/year. |
| 2016 | Chief Scientist of the Ministry of Agriculture Grant. Title: Plants agaist Parkinson Disease. Cooperating investigator, for 3 year. Total budget: $150,000. Researcher's part: $27,000/year. |

##### Other Research Grants

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| 1994 | National Council of Research and Development Grant . Title: Gene bank: herbs. Cooperating investigator, for 3 years. Total budget: $6,500/year. Researcher's part: $6,500/year. |
| 1996 | Vegetable Growers' Association Grant. Title: Improving the quality and quantity of yield of chives for the fresh herb market. Principal investigator, for 1 year. Total budget: $7000. Researcher's part: $25,000 |
| 1996 | Vegetable Growers' Association Grant. Title: The effect of shading treatments on the yield and quality of chives in summer. Principal investigator, for 3 years. Total budget $20,000/year. Researcher's part: $20,000/year.  |
| 1996 | Vegetable Growers' Association Grant. Title: Breeding of unique basil varieties for fresh herbs market. Cooperating investigator, for 3 years. Total budget: $16,000/year. Researcher's part: $8,000/year.  |
| 1996 | Vegetable Growers' Association Grant. Title: Testing polyethylene sheets for the inhibition of foliage disease in cucumbers. Cooperating investigator, for 1 year. Total budget: $5,051. Researcher's part: $1,500 |
| 1996 | Vegetable Growers' Association Grant. Title: Identifying sources of resistance against Fusarium wilt in basil. Cooperating investigator, for 1 year. Total budget: $4,040. Researcher's part: $3,000. |
| 1996 | Zera'im Gedera Grant. Title: Collaborative development of herb seeds for export. Cooperating investigator, for 3 years. Total budget: $12,821/year. Researcher's part: $6,000/year. |
| 1996 | Vegetable Growers' Association Grant. Title: Fresh herbs: cultivation and agro-technical methods. Cooperating investigator, for 1 years. Total budget: $8,416. Researcher's part: $4,200 |
| 1997 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and breeding. Cooperation investigator, for 1 year. Total budget: $11,000. Researcher's part: $6000 |
| 1998 | Vegetable Growers' Association Grant. Title: Fresh herbs: agrotechniques and cultivation. Cooperating investigator, for 1 year. Total budget: $9,000/year. Researcher's part: $4,000/year. |
| 1998 | Vegetable Growers' Association Grant. Title: Residue of pesticides in fresh herbs - expiring rate. Cooperating investigator, for 1 year. Total budget: 19,000. Researcher's part: $9,000. |
| 1999 | Vegetable Growers' Association Grant. Title: Growing of *Umbeliferae* herbs in summer for the fresh market. Principal investigator, for 1 year Total budget $14,000. |
| 1999 | Vegetable Growers' Association Grant. Title: Breeding of unique basil varieties for fresh herbs market. Principal investigator, for 1 year. Total budget: $16,000. Researcher's part: $16,000. |
| 1999 | Vegetable Growers' Association Grant. Title: Residue of pesticides in fresh herbs - expiring rate. Cooperating investigator, for 3 years. Total budget: $14,000. Researcher's part: 7,000$. |
| 2000 | Vegetable Growers' Association Grant. Title: Residue of pesticides in fresh herbs - expiring rate. Cooperating investigator, for 3 years. Total budget: $8,000/year. Researcher's part: $4,000/year. |
| 2000 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and cultivation. Principal investigator, for 1 year. Total budget: $15,000. Researcher's part: $15,000. |
| 2000 | Hishtil Nurseries Ltd.. Title: Introduction and breeding of new varieties of herbs for gardening purposes. Principal investigator, for 5 years. Total budget: $20,000 + royalties. Researcher's part: $20,000. |
| 2000 | Hishtil Nurseries Ltd.. Title: Selection of new varieties of nonthorny caper for farming, ornamental and gardening purposes. Principal investigator, for 3 years. Total budget: $12,000. + royalties  |
| 2001 | Keren Kayemet LeIsrael (KKL). Title: – Application of vetiver for soil preservation in Israel. Principal investigator, for 3 years. Total budget: $10,000/year. Researcher's part: $10,000/year. |
| 2001 | Genesis seeds Co. Ltd.. Title: Breeding herbs for seed production. Principal investigator, for 3 years. Total budget: $72,000 + royalties. Researcher part: Researcher part: $72,000.  |
| 2001 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and cultivation. Principal investigator, for 1 year. Total budget: $12,000. Researcher's part: $12,000. |
| 2001 | Vegetable Growers' Association Grant. Title: Improvement and control of the aroma in fresh herbs. Principal investigator, for 3 years. Total budget: $15,000/year. Researcher's part: $15,000/year. |
| 2002 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and cultivation. Principal investigator, for 1 year. Total budget: $15,000. Researcher's part: $15,000 |
| 2002 | Vetiver Israel Co. Ltd. Title: Using by vetiver for soil preservation in Israel, Principal investigator, for 3 years. Total budget: $20,000 + royalties. Researcher part: $20,000. |
| 2004 | Magnetika Interactive Co. Ltd. Title: *Salvia sclarea* seed oil production, Principal investigator, for 3 years. Total budget: $145,000 + royalties. Researcher part: $145,000. |
| 2004 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and breeding. Principal investigator, for 1 year. Total budget: $20,000. Researcher's part: $20,000 |
| 2005 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and Breeding. Principal investigator, for 1 year. Total budget: $24,000. Researcher's part: $24,000 |
| 2005 | Gadash Ora Co. Title: Production of essential oils and cultivation of rosemary for antioxidant extraction , Principal investigator, for 3 years. Total budget: $60,000 + royalties. Researcher part: $ 60,000. |
| 2006 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and Breeding. Principal investigator, for 1 year. Total budget: $50,000. Researcher's part: $50,000 |
| 2007 | Vegetable Growers' Association Grant. Title: Fresh herbs: agro-techniques and Breeding. Principal investigator, for 1 year. Total budget: $61,000. Researcher's part: $61,000 |
| 2007 | Dudi Zipori Co. Title: Optimization of cultivation of rosemary for antioxidant extraction, Principal investigator, for 3 years. Total budget: $60,000 + royalties Researcher part: 60000$. |
| 2008 | The Israeli Fresh Herbs Growers Association. Title: Breeding of fresh herbs, Principal investigator, for 6 years, Total budget: $120,000/year, Researcher part: $120,000/year. |
| 2010 | The Israeli Fresh Herbs Growers Association. Title: Rhizoctonia Web Blight - A New Disease on Mint in Israel, for 1 year, Total Total budget: $15,000/year, Researcher part: $15,000/year. |
| 2015 | The Israeli Fresh Herbs Growers Association. Title: Breeding of Basil, Principal investigator, for 6 years, Total budget: $30,000/year, Researcher part: $30,000/year. |
| 2016 | Future Crops Co. Title: Development of Title: Development of novel method for Indoor Multi Layer production of herbs , Principal investigator, for 10 years, Total budget: $100,000/year and royalties, Researcher part: $100,000/year. |
| 2016 | Galil Laboratories Co. Title: Development of novel aromatic plants varieties for the cosmetics industry, Principal investigator, for 3 years, Total budget: $30,000/year and royalties, Researcher part: $30,000/year. |
| 2017 | Pharmabis Co. Title: Breeding of cultivars for the medicinal Cannabis production, for 3 years, Total budget: $2,000,000 and royalties, Researcher part: $1000,000. |
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#

**Awards and Scholarships**

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| --- | --- |
| 1989 | Recipient of the Ben-Gurion Award of the General Federation of Labor in Israel for the Project: “Isolation and identification of monoterpenes in aromatic plants”. |
| 1996 | Recipient of the IAS graduate student award at the International Congress on Allelopathy in Cadiz, Spain.  |
| 1999 | Recipient of the Bona-Terra Award of the **Education** Ministryof Israel for introduction of aromatic plants curriculum as enrichment program in high school. |
| 1999 | Recipient of the Gevati Award for breeding new varieties of sweet basil in Israel. |
| 2000 | Recipient of the Gevati Award for breeding varieties of sweet basil resistant to Fusarium wilt. |
| 2002 | Recipient of the Bona-Terra Award of the EducationMinistryof Israel for contribution to the botanical curriculum in high schools. |
| 2007  | Recipient award by SDA spices for 20 years contribution to the MAP production in Israel . |

2012 Recipient the Agritech Price – for noteworthing achievments and contribution to the

 agriculture.

**NATIV DUDAI May 2017**

#### **LIST OF PUBLICATIONS**

**A. Articles in reviewed journals:**

1. Putievsky, E., Ravid, U. and Dudai, N. (1986).

 The essential oil and yield components from various plant parts of *Salvia fruticosa.*

 *J. Nat. Prod.* **49**: 1015-1017.

2. Putievsky, E., Ravid, U. and **Dudai, N**. (1986).

 The influence of season and harvest frequency on essential oil and herbal yield

 from a pure clone of sage (*Salvia officinalis*) grown under cultivated

 conditions.

 *J. Nat. Prod*. **49:** 326-329.

3. **Dudai, N**., Werker, E., Putievsky, E., Ravid, U., Palevitch, D. and

 Halevy, A.H. (1988).

Glandular hairs and essential oil in leaves and flowers of *Majorana syriaca* L.

 *Isr. J. Bot.* **37**: 11-18.

4. Putievsky, E., Ravid, U. and **Dudai, N.** (1988).

 Phenological and seasonal influences on essential oil of a cultivated clone of

 *Origanum vulgare* L*.*

 *J. Sci. Food Agric*. **43**: 225-248.

5. **Dudai, N**., Putievsky, E., Palevitch, D. and Halevy, A.H. (1989).

Environmental factors affecting flower initiation and development of

 *Majorana syriaca* L. (syn. *Origanum syriacum* var. *syriacum*).

 *Isr. J. Bot.* **38**: 229-239.

6. Putievsky, E., Ravid, U. and **Dudai, N**. (1990).

 Effect of water stress on yield components and essential oil of *Pelargonium*

 *graveolens.*

 *J. Ess. Oil Res*. **2**: 111-114.

7. Elnir, O., Ravid, U., Putievsky, E., **Dudai, N.** and Ladezinsky, G. (1991).

 The chemical composition of two Cleary Sage chemotypes and their hybrids.

 *Flavour and Fragrance J.* **6**: 153-155.

8. Elnir, O., Ravid, U., Putievsky, E., **Dudai, N**. and Ladzinsky, G. (1991).

 Genetic affinity between two chemotypes of clary sage (*Salvia sclarea* L.)

 *Euphytica* **54**: 205-208.

9. **Dudai, N**., Putievsky, E., Ravid, U., Palevitch, D. and Halevy, A.H.

 (1992).

Monoterpene content in *Origanum syriacum* L. affected by environmental

 conditions and floweruing.

 *Physiol. Plantarum* **84**: 453-459.

10. Putievsky, E., Ravid, U., **Dudai, N.,** Katzir, I., Carmeli, D. and Eshel, A.

 (1992).

 Variation in essential oil of *Artemisia* *judaica* chemotypes related to

 phenological and environmental factors.

 *Flavour & Fragrance J*. 7: 253-257.

11. Werker, E., Putievsky, E., Ravid, U., **Dudai, N.** and Katzir, E. (1993).

 Glandular hairs and essential oil in developing leaves of *Ocimum basilicum* L.

 *Ann. Bot.* 71: 43-50.

12. Werker, E., Putievsky, E., Ravid, U., **Dudai, N**. and Katzir, E. (1993).

 Glandular hairs, secondary cavities and their essential oil in leaves of

 Tarragon (*Artemisia dracunculus* L.)

 *J. Herbs Spices Med. Plants****.* 2**(3): 19-32.

13. Putievsky, E., **Dudai, N**., Ravid, U. and Katzir, E. (1994).

 A new cultivar of caraway (*Carum carvi* L.) and its essential oil.

 *J. Herbs, Spices Med. Plants* **2**:(2) 81-84.

14. Putievsky, E., **Dudai, N**., Ravid, U., Katzir, E. Michaelovich, Y., Zuabi E.

 and Saadi, D. (1995).

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 in different seasons and plant parts.

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15.. Reuveni, R., **Dudai, N.** and Putievsky, E (1997).

 Evaluation and identification of basil germplasm for resistance to *Fusarium* *oxysporum* f.

 sp. *basilicum*.

 *Plant Dis*. 81: 1077-1081.

16. Ravid, U., Putievsky, E. Katzir, I. Lewinsohn, E. and **Dudai, N**. (1997).

 Identification of (1R)- verbenone in essential oils of *Rosmarinus officinalis* L.

 *Flavour & Fragrance J*. **12:** 109-112.

17. Reuveni, R., **Dudai, N**. and Putievsky, E (1998).

 Nufar: A sweet basil cultivar resistant to fusarium wiltcaused by *Fusarium*

 *oxysporum* f. sp. *basilicum*.

 *Hortic. sci*. **33**: 159.

18. Lewinsohn, E., **Dudai, N**. Tadmor, Y., Katzir, I., Ravid, U., Putievsky,

 E. and Joel, M.J. (1998).

 Histochemical localization of citral accumulation in lemongrass leaves

 ( *Cymbopogon citratus* (DC.) Stoaceae)

 *Ann. Bot*. **81**: 35-39.

19. Putievsky, E., Ravid, U., **Dudai, N**., Galambosi, B. , Aflatuni, A., Pessala, R.

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 Yield potential and essential oil content of *Origanum vulgare, Artemisia*

 *dracunculus* and *melissa officinalis* grown at different site in Israel and

 Finland.

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20. **Dudai, N**., Mayer, A.M., Poljakoff-Mayber, A., Putievsky, E. and

 Lerner, H.R. (1999).

Essential oils as allelochemicals and their potential use as bio-herbicides.

 *J. Chem. Ecol*. **25**: 1079-1089.

21. **Dudai, N.**, Lewinsohn, E., Larkov, O., Katzir, I., Ravid U., Chaimovitch, D.,

 Sa'adi D. and Putienvsky, E. (1999).

 Dynamics of yield components and essential oil production in a commercial

 hybrid sage (*Salvia officinalis* X *Salvia fruticosa* cv. *Newe* *Ya'ar* No. 4).

 *J. Agr. Food Chem.* 47 (10): 4341-4345.

22. Putievsky, E., Paton, A., Lewinsohn, E., Ravid, U., Haimovich, D., Katzir, I.,

 Saadi, D. and **Dudai, N**. (1999).

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 *J. Herbs, Spices Med. Plants***6**:(3) 11-24. No ISI rank

23. **Dudai, N**., Larkov, O., Putievsky, E., Lerner, H.R., Ravid, U.,

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Biotransformation of costituents of essential oils by germinating wheat seeds.

 *Phytochemistry* **55**: 375-382.

24. Lewinsohn, E.,. Ziv-Raz, I., **Dudai, N.,** Tadmor, Y., Lastochkin, E., Larkov,

 O., Chaimovitsh, D., Ravid, U. Putievsky, E., Pichersky, E. and Shoham, Y.

 (2000).

 Biosynthesis of estragole and methyl-eugenol in sweet basil (*Ocimum*

 *basilicum*). Development and chemotypic association of allylphenol

 O-methylation activities.

 *Plant Science* **160**: 27*-*35*.*

25. **Dudai, N.,** Weinberg, Z. G., Larkov, O., Ravid, U. Ashbell, G. and Putievsky, E.

 (2001).

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 Hook).

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26. **Dudai, N.,** Larkov, O., Ravid, U. Putievsky, E. and Lewinsohn, E. (2001).

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 *vulgare* in Israel.
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28. Gross, M., Friedman, J., **Dudai, N.**, Larkov, O., Cohen, Y., Bar, E., Ravid, U.,

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 biosynthesis of anetole and estragole in bitter-fennel (*Foeniculum* *vulgare* Mill)

 var. *vulgare*) chemotypes.

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 Amplified polymorphic DNA, chemical and morphological analyses.

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 Influence of harvest dynamics and cut height upon yield components of sage

 (*Salvia* *officinalis*) L.

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 Cadmium accumulation *in Allium schoenoprasum* L. growing in a liquid

 medium.

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33. **Dudai, N**., Weinstein, Y., Krup, M., Rabinski, T. and Ofir R. (2005).

 Citral is a new inducer of caspase-3 in tumor cell lines.

 *Planta Med.* 71: 484-488.

34. Larkov, O., Dunkenblum, E., Zada, E., Lewinsohn, E., Freiman L. **Dudai, N.**,

 and Ravid, U. (2005).

 Enantiomeric composition of (trans) and (cis) sabinene

 hydrate acetate in *Origanum* species.

 *Flavour & Fragrance J.* 20 (2): 109-114.

35. Amzallag, N., Larkov, O., Ben Hur, M. and. **Dudai, N.** (2005). Soil microvariation in the wild as a source of variability: the case of secondary metabolism in *Origanum dayi* Post.

 *J. Chem. Ecol*. 31(6): 1135-1254.

36. **Dudai, N**., Putievsky, E., Chaimovitch, D. and Ben-Hur M. (2006).

 Growth management of vetiver (*Vetiveria zizanioides*) under Mediterranean

 conditions.

  *J. Environ. Manage.* 81(1): 63-71.

37. Chaimovitsh, D.\*\*, **Dudai, N**., Putievsky, E., and Oshri, A. (2006).

 Inheritance of Resistance to *Fusarium oxysporum* f. sp. *basilici* in Sweet Basil.

 *Plant Dis.* 90(1): 58-60.

38. Yermiyahu U., Shamai, I.\*\*, Peleg R., **Dudai, N.**, and Shtienberg D. (2006).

 Reduction of *Botrytis* *cinerea* sporulation in sweet basil by altering the

 concentrations of nitrogen and calcium in the irrigation solution.

  *Plant Pathology* 55 (4): 544-552.

39. Larkov, O. Matasyoh, J. **Dudai, N**., Lewinsohn, E,, Mayer, A. M. and Ravid, U.

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40. Shafran, E. **\*\***, **Dudai,, N**., and Mayer, A. M. (2007).

 Variation in the level of polyphenol oxidase in basil (*Ocimum basilicum* L.)

 during growth and development and following cold stress.

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 41. Krizevski, R. **\*\***, **Dudai, N,** Bar, E. and Lewinsohn, E. (2007) .

 Developmental patterns of propylphenylamino alkaloids accumulation in khat

 (*Catha edulis*, Forsk., Celastraceae).

 *J. Ethnopharmacol****.*** 114(3): 432-438*.*

42. Davidovich-Rikanati, R., Sitrit, Y., Fallik, E., Bensti, C., Bar, E., Bilenko, N.,

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 Enrichment of the aroma and taste of tomatoes by diversion of the plastidial

 terpenoid pathway.

 *Nature Biotechnology* 25 (8): 899-901.

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44. Larkov, O. Zaks, A., Bar, E., Lewinsohn, E, ***Dudai, N.,*** *Mayer, A. M. and Ravid,*

 *U. (2008).*

 *Enantioselective monoterpene alcohol acetylation in Origanum, Mentha and*

 *Salvia* species.

 *Phytochemistry* 69: 2565–2571.

45. **Dudai, N.**, Raz, A., Hofesh, N., Aharon , A., Ficsher, R., Segev, D. and

Chaimovitsh, D. (2008).

 Antioxidant activity and phenol content of plant germplasm originating in

 the Dead Sea area.

  *Isr. J. Plant Sci.*56: 227-232.

46. Gross, M., Lewinsohn, E., **Dudai**, **N**., Cohen , Y. and Friedman, J. (2008) .

 Flowering dynamics and crossability of different populations of bitter

 fennel *(Foeniculum vulgare* Mill*. var. vulgare, Apiaceae).*

 *Isr. J. Plant Sci.* 56: 215-226.

47. Krizevski, R.\*\*, **Dudai, N,** Bar, E. and Lewinsohn, E. (2008).

 Quantitative stereoisomeric determination of phenylpropylamino alkaloids in khat

 (*Catha* *edulis* Forsk.) using chiral GC-MS.

 *Isr. J. Plant Sci.* 56**:** 207-213.

48. Vaknin, Y., **Dudai, N**., Murkhovsky, L., Gelfandbein, L., Fischer, R. and Degani

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 Effects of pot size on leaf production and essential oil content and composition of

 Eucalyptus citriodora Hook. (Lemon-scented gum).

 *J. Herbs Spices & Med Plants 15:164-176.*

49. **Dudai, N.**, Chaimovitsh, D., Larkov, O., Ficsher, R., Blaicher, Y. and Mayer,

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 *Plant and Soil* 314: 311-317.

50. Bernstein, N., Chaimovitsh, D. and **Dudai, N.** (2009)**.**

 Effect of irrigation with secondary treated effluents of essential oil, antioxidant

 activity and phenolic compounds, in *Origanum vulgare* and *Rosmarinus*

 *officinalis*.

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51. Gross, M., Lewinsohn, E., Tadmor, Y., Bar, E., **Dudai, N.,** Cohen, Y. and

 Friedman, J. (2009).

 The inheritance of volatile phenylpropenes and their distribution within the plant

 During ontogenesis in two chemotypes of bitter fennel (*Foeniculum vulgare* Mill.

 var. vulgare, Apiaceae).

 *Biochem. Syst. Ecol* 37: 308-316.

52. Edelstein, M., Plaut, Z., **Dudai, N.** and Ben-Hur, M. (2009).

 Vetiver (*Vetiveria* *zizanioides*) responses to fertilization and salinity under

 irrigation conditions.

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53. Üstüner, Ö., Wininger, S., Gadkar, V., Badani, H., Raviv, M., **Dudai, N.,** Medina, S. and

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54. Chaimovitsh, D.\*\*, Abu-Abied, M., Belausov, E., Rubin, B., **Dudai, N\***. and

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Salinity-induced changes in essential oil, pigments and salts accumulation in

 sweet basil (*Ocimum basilicum*), in relation to alterations of morphological

 development .

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58. Szalai, Z., Dai, N., Danin. A., **Dudai. N\*.** And Barazani, O. (2010).

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 Belanger, F.C. (2010).

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 cytometry.

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 Treatment of upper respiratory tract infections in primary care: a randomized study

 using aromatic herbs.

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62**.** Fischer, R.\*\*, Nitzan, N., Chaimovitsh, D., Rubin, B.and **Dudai, N.** (2011).

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63. Widiez, T., Hartman, T. G., **Dudai, N.,** Yan, Q., Lawton, M., Havkin-Frenkel, D., and

 Belanger, F.C. (2011).

 Functional characterization of two new members of the caffeoyl CoA O-

 methyltransferase-like gene family from Vanilla planifolia reveals a new class of

 plastid-localized O-methyltransferases.

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 Sadot, E.and **Dudai, N.** (2012).

The relative effect of citral on mitotic microtubules and γ tubulin in wheat roots and

 BY2 cells.

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65. Nitzan, N., Chaimovitsh, D, Davidovitch-Rekanati, R., Sharon, M., Freeman, S.and

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 [*Planta Med.*](http://www.ncbi.nlm.nih.gov/pubmed/22495440) 78(8): 838-842.

69. Altshuler, O.\*\*, Abu-Abied, M., Chaimovitsh, D., Shechter, A., Frucht, H.,

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70. Serfaty, M. \*\*, Ibdah, M., Fischer,R., Chaimovitsh, D., Saranga, Y.and **Dudai, N**.

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 grown under different planting times, plant stands and harvest regime. *Ind. Crops &*

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Physiological conjuction of allelochemicals and desert plants. *PLoS ONE. 8(12): e81580.*

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Effects of nitrogen, phosphorus and irrigation frequency on essential oil content and composition of sage (*Salvia officinalis* L.).

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\*\* A student under my guidance

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1. Dudai, N., Poljakoff-Mayber, A., Lerner, H.R. and Putievsky, E. (1994).

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 Crop physiology and agrotechniques for fresh herbs.

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4. **Dudai, N**., Putievsky, E., Chaimovitsh, D. and Ben Hur, M. (2004).

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 Chemical variation in a population of *Pistacia lentiscus* L.

 *Haya’ar* (16):36-45 (with English summary and titles).

**C. Publication articles in *Acta Horticulturae***

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 indigenous population of *Foenicolum vulgare* Mill.

 *Act. Hort*. (ISHS) 517 pp 467-477.

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1. **Dudai, N.**, Larkov O. and Lewinsohn E. (2004).

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 *Act. Hort*. (ISHS) 629:499-504

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 Genetic variation of phenolic compounds content, essential oil composition and anti oxidative activity in Israel grown *Mentha* *longifolia* L.

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 (*Origanum* spp.)

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1. **Dudai, N**., Fischer, R., Segev, D., Chaimovitsh, D., Rosenzweig, N. and Shimoni,

 M. (2008).

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 *Act. Hort.* (ISHS) 860:167-171.

1. **Dudai, N. (**2012)**.**

Domestication and Breeding of Wild Medicinal and Aromatic Plants – 30 Years of

 Experience in Israel

 *Act. Hort.* (ISHS) 955:175-183.

**D. Books, book chapters and invited reviews:**

**a. Book editing:**

1. Havkin-Frenkel, D., Belanger, F., Frenkel, C. and **Dudai, N.** (Eds.) (2005).

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Allured Publishing Corp, Carol Stream, IL USA. 100pp.

1. Havkin-Frenkel, D., Frenkel, C. and **Dudai, N.** (Eds.) (2006).

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**4.** Yaniv, Z. and **Dudai, N**. (2014).

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**5.** Havkin Frenkel, D. And **Dudai, N.** (2016) Biotechnology in Flavor Production – Second

 Edition. Wiley-Blackwell, Selangor, Malasya. ISBN: 978-1-118-35406-3.

**b. Book chapters and invited reviews:**

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 Florida. pp. 487-498.

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 WFL Publisher, Helsinki, Finland. pp. 77-90.

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 medicinal crops, Vol.6, CRC Press, Boca-Raton, FL. pp. 338-359

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Effective post harvest Processing Turns Herbal waste into Beneficial Product– The case of oregano.

 *Stewart Postharvest Review Journal* 7: (1) 1-5.

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# Endemic Aromatic Medicinal Plants in the Holy Land Vicinity

In: Yaniv, Z. and Dudai, N. (Eds) Medicinal and Aromatic Plants of the Middle-East, Springer, The Nethelands, pp. 37- 58.

1. Ben Shabat, S., [Goloubinoff](http://link.springer.com/search?facet-author=%22Pierre+Goloubinoff%22), P., **Dudai, N.** and Lewinsohn, E. (2014)

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1. **Dudai, N.** andAmar, Z.

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In: Boas, A.J. (Ed.), *Monfort: History, Early Research and Recent Studies,* Brill, Lieden, The Nethrlands *(in press).*

**E. Allowed patents and registered cultivars**

 **a. Patents**

 **Dudai, N.,** Yaniv, Z., Putievsky, E., Shefferman, D., Chaimovitsh, D. and

 Sa’ady, D. (2006).

  Compositions containing as the active ingredient components from *Salvia*

 *sclarea* seed.

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Ofir, R., Rachmilevich, S., Amiel, E., **Dudai, N.** Rabinsky, T. and Ben Yehoshua, S. (2012).

Composition comprising beta Caryophyllene and methods of utilizing the same.

Us application publication US20140030289 A1.

**b. Cultivars**

1. Putievsky, E., Ravid, U., Kaner, J.and **Dudai, N**. (1997).

"Moran"- a cultivar of sage.

1. **Dudai, N**., Reuveny, R. and Putievsky, E. (2000).

"Nufar" - a sweet basil variety (with resistence to Fusarium).

 Contract with Genesis seeds Co.

1. **Dudai, N**., Putievsky, E. and Sa'adi, D. (2000).

"Barbecue" - a variety of rosemary (ornamentaltype).

 Contract with Hishtil Afula Ltd, mainly for export.

1. Putievsky, E. and **Dudai, N**. (2000).

 "Oren"- a cultivar of oregano.

 Grown in Israel mainly as fresh herb.

1. Putievsky, E. and **Dudai, N**. (2000).

 "Chen"- a variety of basil.

1. Putievsky, E. and **Dudai, N**. (2000).

 "Carmeli" - a Carvacrol chemotype cultivar of *Origanum* *syriacum*

("Za'atar").

1. Putievsky, E. and **Dudai, N**. (2000).

 "Tavor"- a Thymol chemotype cultivar of *Origanum syriacum* ("Za'atar").

1. Putievsky, E. and **Dudai, N**. (2000).

 "Dan" - a variety of celery.

1. **Dudai, N**., Putievsky, E. Sa'adi, D., Ravid, U., Reuveni, R. and Chaimovitsh, D.

(2002).

“Perrie” –A sweet basil variety for the fresh herb market (with

 resistance to fusarium).

 This is the main cultivar grown exclusively by the Israeli fresh herb growers,

exported for ~45 million Euro per year.

1. **Dudai, N**., Putievsky, E. Sa'adi, D., Ravid, U., Reuveni, R. and Chaimovitsh, D.

(2002).

“Hagar” –A sweet basil variety for the fresh herb market (with

 resistance to fusarium, preferred by the markets of France).

 This cultivar is exclusive for the Israeli fresh herb growers.

1. **Dudai, N**., Putievsky, E. Sa'adi, D., Ravid, U., Reuveni, R. and Chaimovitsh,

 D. (2002).

“Nirit” A (Trade name (“Aroma 2”) sweet basil variety for the fresh herb market (with resistance to fusarium).

 This cultivar grown worldwide mainly for the fresh-cut production.

1. **Dudai, N**., Putievsky, E. Sa'adi, D. . and Chaimovitsh, D. (2002).

"Cardinal" –Basil for ornamental uses.

1. **Dudai, N**., Putievsky, E. Sa'adi, D., and Chaimovitsh, D. (2002).

 “Adi”- A sweet basil variety for the pots production (compact, with small leaves and

 resistance to fusarium).

1. Putievsky, E., **Dudai, N.** , Ravid, U., Sa'adi, D., Larkov, O., Lewinsohn, E.,

 and Chaimovitsh, D. (2002).

 "Nazareth" - a variety of sage (ornamentaltype**).**

Exclusive contract with Hishtil Afula Ltd.

1. **Dudai, N**., Putievsky, E. Sa'adi, D. . and Chaimovitsh, D. (2003).

"Virginia" - Thyme for the fresh herbs market.

1. **Dudai, N**. and Putievsky, E. (2003).

 “Primavera” - a cultivar (somatic mutation) of vetiver (*Vetiveria zizanoides*).

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi D. (2003).

 “Arogreen” – a cultivar (somatic mutation) of lemongrass (*Cymbopogon*

 *citratus*).

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi D. (2005).

 **"**Israel**"**  - a variety of reach carnosic acid rosemary.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi D. (2005).

 **"**Oranit**"**  - a variety of reach carnosic acid rosemary.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi D. (2005).

 **"**Star**"**  - a variety of reach carnosic acid rosemary.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Inbar" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D.(2007).

"Green Flame" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D.(2007).

"Red Finger" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Garland" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Lady red" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Red Count" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Verdant" – An ornamental basil clone.

1. **Dudai, N**., Putievsky, E., Chaimovitsh, D. And Saadi, D. (2007).

"Alina" – Clary sage for reach omega 3 seed oil production.

1. **Dudai, N**., Chaimovitsh, D., Putievsky, E. And Saadi, D. (2008).

 "Adom Adom" – A red basil variety.

1. **Dudai, N**., Chaimovitsh, D., Putievsky, E. And Saadi, D. (2008).

 " Rehov" – A variety of sweet basil.

1. Chaimovitsh, D., **Dudai, N**., Putievsky, E. And Saadi, D. (2008).

 " Yardena" – A variety of sweet basil.

1. Chaimovitsh, D., **Dudai, N**., Putievsky, E. And Saadi, D. (2008).

 " Revayah" – A variety of sweet basil.

1. **Dudai, N**., Chaimovitsh, D., Putievsky, E. And Saadi, D. (2008).

 "Caspit" – A variety of sage for fresh herb production.

1. **Dudai, N**., Chaimovitsh, D., Putievsky, E. And Saadi, D. (2008).

 " Silver-line" – A variety of sage for fresh herb production.

# **F. Articles in non-reviewed journals**

1. Putievsky, E., Ravid, U., **Dudai**, N. and Zuabi, E. (1984).

Plant height and harvest frequency of sage.

 *Hassadeh* **64**: 1330-1333 (in Hebrew).

1. Sanderovich, D., Putievsky, E., **Dudai, N.** and Zuabi, E. (1984).

 Irrigation of oregano.

 *Hassadeh* **64**: 1334-1336 (in Hebrew).

1. Putievsky, E., Ravid, U.and **Dudai,** **N.** (1985).

 Yield components of *Hyssopus officinalis* L. (hyssop).

 *Hassadeh* **65**: 1774-1775 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N.** and Zuabi, E. (1985).

 *Salvia dominica*, a new source for essential oil.

 *Hassadeh* **65**: 1974-1977 (in Hebrew).

1. **Dudai, N**., Putievsky, E., Ravid, U., Michaelovich, Y., Zuabi, E. and Saadi, D.

(1986).

Seasonal influence on oregano quality.

 *Hassadeh* **66**: 2232-2234 (in Hebrew).

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 (1986).

 Dry herbs - state of art and their future in Israel.

 *Hassadeh* **66**: 1782-1784 (in Hebrew).

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 *Pelargonium graveolens.*

 *Hassadeh* **67**: 2241-2243 (in Hebrew).

1. Putievsky, E., **Dudai, N**., Ravid, U., Saadi, D.and Michaelovich, Y. (1987).

 Drip irrigation in aromatic plants.

 *Hassadeh* **67**: 1788-1790 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**., Michaelovich, Y., Saadi, D., Zuabi, E.and

 Bassat, M. (1987).

 Production of seed herbs - state of art and their future in Israel.

 *Hassadeh* **67**: 2015-2016 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**.and Sanderovich, D. (1987).

 Advantages and disadvantages of clone selection in oregano.

 *Hassadeh* **67**: 1550-1552 (in Hebrew).

1. **Dudai, N**. and Putievsky, E. (1988).

Aromatic plants and essential oils for weed control in organic agriculture.

 *Haklaut Mitchadeshet* (8): 15-17 (in Hebrew).

1. **Dudai, N**., Putievsky, E., Ravid, U., Palevitch, D.and Halevi, A. (1988).

Seasonal influence on yield components, morphology and phenological

characters of *Majorana syriaca*.

*Hassadeh* **69**: 422-425 (in Hebrew).

1. **Dudai, N**., Putievsky, E., Ravid, U., Saadi, D., Michaelovich, Y.and Zuabi, E.

(1988).

Selection of high yield clones of zaatar (*Majorana syriaca*).

*Hassadeh* **68**: 2096-2098 (in Hebrew).

1. **Dudai, N**., Putievsky, E., Ravid, U.and Werker, E. (1988).

Glandular hairs and essential oil of aromatic plants from the Labiatae family.

 *Rotem* (28): 5-18 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**., Michaelovich, Y, Saadi, D.and Zuabi, E.

 (1988).

 Changes of yield components of three aromatic plants during the year.

*Hassadeh* **68**: 2316-2318 (in Hebrew).

1. **Dudai, N**. (1989).

Essential oil in aromatic plants.

*Lada'at* **19**(6): 11-13 (in Hebrew).

1. Putievsky, E., **Dudai, N**. and Ravid, U. (1989).

 Potential and difficulties in growing organic herbs.

*Haqla'ut Mithaddeshet* (11): 23-36 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**. (1989).

Fresh herbs - research report.

*Gan, Sade uMesheq* (5) 54-60 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**., Michaelovich, Y., Zuabi, E., Saadi, D.,

 Chibutero, S. (1989).

 Fresh herb-research report.

 *Gan, Sade uMesheq* (3): 59-62 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**., Zuabi, E., Michaelovich, Y.and Saadi, D.

 (1989).

 The influence of harvesting height on yield components of aromatic plants.

*Hassadeh* **69**: 1421-1429 (in Hebrew).

1. Putievsky, E., **Dudai, N**., Ravid, U., Michaelovich, Y., Saadi, D.and Zuabi, E.

 (1990).

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 *Hassadeh* **70**: 708-710 (in Hebrew).

1. Putievsky, E., Ravid, U., **Dudai, N**., Saadi, D., Zuabi, E. and Michaelovich, Y.

 (1990).

 Quality varieties of *Salvia officinalis* as a source for herb and essential oil.

 *Hassadeh* **69**: 1600-1602 (in Hebrew).

1. Orlan, Z., Refler, M., Putievsky, E., Ravid, U., **Dudai, N**. Katzir E.,

 Michaelovich, Y., Saadi, D. and Zuabi, E. (1991).

 Essential oil of *Myrtus communis*.

*Hassadeh* **71**: 1367-1368 (in Hebrew).

1. Orlan, Z., Putievsky, E., Ravid, U., **Dudai, N**. and Refler, M. (1991).

 Growing *Myrtus communis* for religious purposes and for essential oil

 production.

*J. Biol. Teach*. **126**: 48- 62 (in Hebrew)

1. Putievsky, E., Ravid, U., **Dudai, N**., Michaelovich, Y., Zuabi, E. and Saadi, D.

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**NATIV DUDAI November 2017**

# **LIST OF ACHIEVEMENTS**

# **An overview**

My research focuses on medicinal and aromatic plants (MAP): their biodiversity, physiology, production and the bio-activity of their secondary metabolites. Studying the factors affecting the essential oil content and composition in aromatic plants has enabled us to optimize the production of essential oil. I have organized a large live germplasm collection with a computerized database that enables tracking of various parameters in various accessions. Based on all of this I have been involved in the introduction of MAP; the domestication of local wild plants; and the selection, breeding and adaptation of agricultural practices. Systematic screening yielded the discovery of *Salvia sclarea*, that is usually used for essential oil production or sclareol extraction (articles A#7,8), as a novel source of seed oil production rich in omega-3- linolenic acid (Patent, see p 30). Studying the chemical variation of rosemary led to the selection of new varieties containing a high level of carnosic acid for antioxidant extraction (article A#45,50,56; cultivars #18,19,20). One of my main projects is the research and breeding of basil. I have devoted considerable effort to the isolation and introgression of Fusarium wilt resistance to horticulturally elite sweet basil varieties. The results of my research have contributed greatly to the production of fresh herbs in Israel, enabling it to expand to 150 million USD annually. Some of these new varieties, such as ‘Nufar’, Nirit (“Aroma 2” and Perrie, are now available from seed companies internationally and are almost the only basil varieties that are cultivated in Israel. The observations in the experimental fields led me to investigate the alleopathic effect of the aromatic plants as is elaborated below on p. 56-57.

1. **General contribution to agricultural sciences**

**Research on factors affecting content and composition of essential oil in aromatic plants**:  The focus of the research was to observe the effect of developmental and environmental conditions on the content and composition of secondary metabolites in several MAP (articles A #40,41,48,50,56,73,75). My approach was to identify factors influencing the content and composition of volatiles and to characterize each one of them separately; and also to study their interactions. Beside the environmental factors, the leaf age (articles A#24,26,28,62) and flowering process (articles A#5, 9) have an impact on the levels and the composition of essential oils in the leaves. The influences could also be indirect. For instance, flowering decreases the concentration of the essential oils in leaves, although the environmental conditions that promote flowering (article A# 5) tend to increase the level of the essential oils in the leaf. Actually, the total levels and composition of the essential oils are a result of the balance between these opposing influences (articles A#9).  I reviewed these effects in two chapters in books (D#1,4). I was also involved in some studies on the anatomy of the essential oil trichomes in various species (articles A#3,11,12,18).

**Research on MAP biodiversity**: We created a large living collection of species and varieties of MAP, from Israel and from other countries, during years of introduction and breeding projects at the Newe Ya'ar Research Center. I have organized and compiled these collections as a germplasm bank, with a computerized database, that enables tracking of various parameters in various accessions. This germplasm bank was added to the "Israel Gene Bank" as a MAP section, and all of the data are, subsequently, accessible to the public. This ever-expanding collection offers the opportunity to carry out studies on plant growth under typical local conditions and also to observe genetic variation among species and varieties.  The collection is used additionally as a part of the introduction process as well as a base for selection by screening of various traits, such as desirable natural products, bio-activity or adaptation of cultural practices. The introduction of various MAP plants from the world to Israel has allowed the study of their genetic relationships. The collection now contains more than 1200 accessions belonging to 82 species. A primary emphasis is on the preservation of the germplasm as living clones, so that after any screening one can go back to a desired genotype. This system is continuously expanding by systematic collection projects of wild plants with full representation of their genetic diversity in Israel. Israel is a junction of several radically different phyto-geographical regions, which results in a wide biodiversity in its small area. Because Israel contains many endemic species, which for the most part have never been investigated, its flora is very interesting scientifically. In recent years I was involved in studying local native plants, such as *Origanum dayi, Origanum ramonense, Origanum syriacum, Micromeria fruticosa, Mentha longifolia, Nepeta spp., Foeniculum vulgare, Artemisia Sp. Portulaca oleracea, Chiliadenus iphionoides, Mentha longifolia, (A#39,44,45,46,58,61,66 ;C# 7;D#10.*)

**Biological activities of secondary metabolites from MAP:** Although essential oils have been known as inhibitors of germination since the early 1920s, their mode of action is still a matter of speculation. I initiated a study aimed at the characterization of the effects of several essential oils and their components on seed germination by developing a highly specific method to assess their toxicity in seeds (article A#20 has been cited 111 times). We found that essential oils and their components are absorbed from the gaseous phase, accumulate mainly in the embryos and are already effective a few hours after their application (Da #2). I also found that due to enzymatic activity present in the seeds and in the microflora (especially bacteria) that surround them, essential oils can be metabolized and their composition changed (A#23,72;C#4,Da#2). One of the major inhibitors is citral. This finding led us to test its activity against cancer, and we found that citral induces apoptosis in tumor cell lines by the activation of the enzyme Caspase – 3 (A#33). In a further work I demonstrated the mechanism of allelopathy *in vivo*, incurred by residues of aromatic plants in the soil. There are many previous studies that have demonstrated activity of “allelochemicals” *in vitro* in the laboratory, based on observations of suspected allelopathic effects in nature.  However, in my study I showed that volatile compounds are released *in vivo* from the plant material and are taken up by seeds, inhibiting their germination. I also investigated the metabolism and degradation of the volatiles in different soils and the effect of the soil microflora on this process (A#49,71). In a new study, in collaboration with Dr. E. Sadot and Prof. B. Rubin (PhD thesis of D. Chaimovitsh) we found that exposure of plants to citral or some of its derivatives, at the gaseous phase, disrupted microtubules of Arabidopsis seedlings, wheat roots and BY2 cells, whereas actin filaments and the plasma membrane remained intact. These findings lead us to hypothesize a primary mode of action of the allelopathic effect of essential oils. A paper on this study has been published in The Plant Journal, Plant Biology and Weed Science (A#54,64,77). I was invited to give lectures about this topic in 2007, 2008, 2009 2011 and 2012 in international conferences in the world.

In addition, I am involved in the study of aspects of the production and bio-activity of MAP metabolites, such as antioxidant and antimicrobial activity (A#40,45,50,56, 57,60; C#7,8), alkaloids in *Catha edulis* (A#41,47) anticancer activity (A#67) and effects on fungi (A#43).

**2.** **Achievements in applied research specifying major contributions to agriculture in Israel and abroad.**

**Development of agrotechniques for the profitable cultivation of fresh herbs:**

I lead the research programs addressing problems concerning the growth of aromatic crops for the fresh herb export market. Experiments were conducted in many species such as thyme, oregano, marjoram, basil, mint, melissa, sage, coriander, chervil, lovage and dill (A#40,48,50,55,59,62,65;C#9, F#89-98). The results of these experiments contributed to establish and optimize the cultivation of fresh herbs in Israel. The export of fresh herbs is now about 120 million USD a year. This work has been performed with the aid of extension specialists and local researchers in each region of Israel. In addition, during the last 6 years I have led some projects to develop new crops in Israel, such as Stevia (F#96); essential-oil production (A#50,55;F#88, 99); clary sage as a novel source of seed oil production rich in omega-3- linolenic acid (Patent) and rosemary for antioxidant production (Eb#18,19,20). All of these projects are already in their first stages of commercialization. Recently (2012) I got the Agritech Award for my contribution to the agriculture.

**Research and breeding of sweet basil:** The major fresh herb crop for export in Israel is sweet basil. In the early 1990s, the varieties that were grown in Israel were those used for the dry herb market and were not suitable for the fresh market, mainly due to large undesirable leaves and the high sensitivity to diseases during the winter under greenhouse conditions.  In the first stage, I initiated a program to develop varieties suitable for the fresh market. This included acceptable appearance, relatively small leaves and a longer shelf-life (Db #3).  *Fusarium wilt resistance*: Fusarium wilt became one of the major limiting factors for the production of fresh basil, due to monoculture practices and the ban on the use of methyl bromide. From my work, the first Fusarium wilt resistant hybrid cultivar (Nufar) was developed (A#17). Later, we studied the mode of the inheritance of Fusarium wilt resistance in sweet basil. We found that the resistance is a dominant Mendelian trait, and have developed methodology for the inclusion of the resistance trait into existing cultivars by conventional breeding (A#37). As the market in Europe prefers the Genovese-type basil, with its unique aroma and smaller leaves, I developed Fusarium wilt resistant varieties of this type and released three varieties: ‘Perrie’, ‘Hagar’ and ‘Nirit’ (Db #3). The Perrie is the main grown cultivar in Israel, exported in volume of more then 45 million USD per year. Recenly we released 3 new cultivars (Eb#30,31,32) for the summer production in Israel: their tolerance to high tempratures enables to avoid infection by the Downy Mildew disease. The Nufar, Hagar ("Aroma 1") and Nirit ("Aroma2") seeds are produced by Genesis seeds Co. and sold worldwide mainly for the professional growers market. The cultivar Cardinal is sold worldwide as ornamental plants for gardening.

One more important parameter of basil is the tolerance to chilling, mainly in cold storage. I have studied in collaboration the physiology of leaf browning under low temperatures associated with the activity of the enzyme polyphenole-oxidase and the phenols level (A#40). A breeding program based on this study yielded some new tolerant genotypes that will be released next year.

Our experience shows that when the wild types are included in the breeding of basil, change in its aroma quality may occur by changing the composition of the essential oil (D #8). During the last four years I have studied the mode of inheritance of the aroma factors of basil, by crossing various chemotypes (C#10 and another paper in preparation). Crossing the ornamental cultivar “Cardinal” with “Perrie” yielded F2 segragants with huge chemical, morphological and color variation (C#10.). This enabled us to select a series of new ornamental cultivars (Eb #21-27).  This work led me to to use this plant material to set a gene map of basil (in progress).