**Asher Bar-Tal**  **December 2014**

**Part I: CURRICULUM VITAE**

1. **Personal**

Department of Soil Chemistry, Plant Nutrition and Microbiology

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web –site: http://www.agri.gov.il/en/people/675

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| **Dates** | **Description** | |
| 1954 | | Born in Israel |
| 1968 - 1972 | | High-school education in Tichon Hadash at Tel Aviv, Israel |
| 1972 - 1976 | | Military service in paratroops as an officer (captain) |

1. **University Education and Additional Training**

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| **Dates** | **Description** |
| 1977 – 1980 | B.Sc. in Agronomy, Soil Science at the Hebrew University of Jerusalem, Israel |
| 1980 – 1983 | M.Sc. in Soil Science at the Hebrew University of Jerusalem, Israel  Title of thesis: Zinc movement to a simulated root in absorbing porous media as affected by pH and various chelating agents  Supervision by: Prof Y. Chen and Dr B. Bar-Yosef |
| 1983 – 1987 | Ph.D. in Soil Science at the Hebrew University of Jerusalem, Israel  Title of thesis: Effect of pepper (*Capsicum annuum*) seedling nutrition in the nursery on transplant development, establishment in the field and fruit yield  Supervision by: Prof U. Kafkafi and Dr B. Bar-Yosef |
| 1987 – 1988 | Postdoctoral position at the University of Delaware, Newark, DE USA. with Prof. Donald L. Sparks  Research subject: Kinetics of K-Ca exchange on clays and soils |
| 1996 – 1997 | Sabbatical leave at the Cooperative Research Centre for Legumes in Mediterranean Agriculture (CLIMA) at the University of Western Australia, Perth, WA, Australia with Dr. J.W. Bowden  Research subject: Application of the NWHEAT-APSIM model to predict protein content in wheat grain in Mediterranean climate |
| 1997 (March) | Trainee at the Division of Tropical Crops of CSIRO, Brisbane, QD, Australia with B.A. Keating  Research Subject: The APSIM model |
| 2000 (November) | Trainee at the Unite de Recherches en Echophysiologie et Horticulture, INRA, Avignon, France, with Michel Genard |
| 2004 (August) | Researcher exchange Researcher exchange of the Joint Dutch – Israel Program, Wageningen University and Research Center, with Leo Marcelis  Research Subject: Physiological Disorders of Pepper fruits |
| 2008 – 2009 | Sabbatical leave at the Department of Land, Air and Water Resources, UCDavis, University of California, Davis, CA, USA with Prof. W. Horwath.  Research subject: Effect of application mode on decomposition rate of plant residues. |

1. **Positions Held and Academic Status**

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| **Dates** | **Description** | |
| 1988 to date | Research Scientist at the ARO, The Volcani Center, Institute of soil, water & Environmental Sciences | |
| 2006 | Promoted to Senior Scientist (Rank A) | |
| 2011-2013 | Head, Department of Soil Chemistry, Plant Nutrition and Microbiology | |
| 2014 - to date | | Scientific Director; R&D Ramat Hanegev |

1. **Training / Teaching Experience**
2. Academic Contribution:

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| **Dates** | **Description** |
| 1996 | Lecturer at the Hebrew University  Title of the course: Soilless Culture and Root Environment |
| 1998-2002 | Lecturer at the Hebrew University  Title of the course: Soilless Culture and Root Environment |

1. Guidance of M.Sc. Students:

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| **Graduation date** | **Name** | **Title of thesis** | **Guidance with** |
| 2001 | \*Mr. Jonatan Oserovitz | Environmental factors effecting blossom end rot in pepper | Prof. I. Marer |
| 2003 | \*Mr. Eviatar Ityel | The interactions between radiation and fertilization effects on pepper | Prof. J. Elkind |
| 2012 | \*Ms. Lilach Barsheshet | Effects of water quality and compost amendment on remediation of soil in Bet Shean valley | Dr G. Levy and Dr M. Shenker |
| 2014 | \*Ms. Hila Hecht | Greenhouse gas fluxes from soil amended with sewage sludge stabilized by different techniques | Dr P. Fine |
| 2012 to date | \*Mr. Noam Ben Naim | Effects of agricultural management and environmental factors on greenhouse gas emissions from soil in organic agriculture | Prof M. Raviv |
| 2013 to date | \*Mr. Yotam Guetta | Effects of agricultural management and environmental factors on soil organic matter dynamics and soil fertility in organic agriculture | Dr M. Shenker |
| 2013 to date | \*Ms. Dana Mienis | The effect of bedding treatment method (cultivation) on greenhouse gas emissions from dairy | Prof A. Haim and Dr D. Katz |
| 2014 to date | \*Mr. Gadi Afik | Development of blueberry (*Vaccinium* spp.) production in the mountain region | Dr S. Zilkah |
| 2014 to date | \*Mr. Beari Kaner | Reduction of downward nitrate leaching – a lyzimeter study | Dr D. Kurtzman |

\*under my direct supervision

1. Guidance of Ph.D. Students:

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| **Graduation date** | **Name** | **Title of thesis** | **Guidance with** |
| 2007 | \*Mr. Benjamin O. Danga | Long term chickpea-wheat rotation effects on residual soil moisture, soil nitrogen and wheat performance | Dr I. Wakindiki and Dr J. Oumma |
| 2013 | \*Mr. Guy Tamir | The effects of organic matter decomposition on carbonate dissolution and precipitation processes and carbon fate in soils | Dr M. Shenker |
| 2014 | Mr. Ron Seligman | The coupling of calcium and water in the whole Plant non-destructive measurements using radio-Sr as tracer | Prof A. Schwartz |
| 2013 to date | Mr. Moshe Halpren | Interrelation of photosynthesis, water uptake, and nitrogen assimilation in an enriched CO2 world | Dr Uri Yermiyahu |
| 2014 to date | \*Mr. Nativ Rotbart | Organic nitrogen uptake by agricultural crops as affected by microorganisms competition | Dr Adi Oren |

\*under my direct supervision

1. Post-Docs and Visiting Scientists:

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| **Dates** | **Name** | **Research subject** |
| 1995-1997 | Dr. Peiling Yang | Root architecture as affected by mineral nutrition |
| 2000-2001 | Mr. Jacques Beraud | Simulation of organic wastes decomposition and N transformation and transport in soil |
| 2002-2003 | Dr. Rajandil S. Antil | Organic wastes decomposition and N transformation in soils |
| 2003-2004 | Dr. Isaiah Wakindiki | Chickpea residues decomposition in soils from Kenya, incubation study and simulation |
| 2005 | Dr. Li-Xin Zhang | Safflower response to irrigation head and N dose |
| 2004-2007 | Dr. Hadar Heller | Effects of Soil Properties and Organic Residues Management on C Sequestration and N Losses. |
| 2014 to date | Dr. Guy Tamir | Fertigation of Bioefectors in crop production. |

1. Organization of Courses

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| **Dates** | **Duration** | **Place** | **Title** |
| 1994 | 2 weeks | Beijing, China | Fertigation |

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

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| **Dates** | **Description and role** |
| 1994-1996 | BARD proposal evaluation panel – Crop Production; Member |
| 1997-1999 | BARD proposal evaluation panel – Soil; Member |
| 2006 | BARD-QICARP (Israel-Queensland) proposal evaluation panel – Soil; Member |
| 2014-2015 | BARD proposal evaluation panel – Environment/Water/Renewable Resources; Chairman |

1. National:

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| **Dates** | **Description and role** |
| 1994-1996 | The Chief Scientist Research Proposal Evaluation Committee – Horticulture and Field Crops; Member |
| 1997-1999 | The Chief Scientist Research Proposal Evaluation Committee – Water Use Efficiency; Member |
| 2000 | The professional committee of the vegetable branch of the ministry of Agriculture; Member |
| 2004-2007 | The Chief Scientist Research Proposal Evaluation Committee – Protected Agriculture; Member |
| 2004-2009 | The Chief Scientist Research Proposal Evaluation Committee – Irrigation with Reclaimed Water; Member |
| 2010-2012 | The Chief Scientist Research Proposal Evaluation Committee – Organic Farming; Member |
| 2013-2014 | The Chief Scientist Research Proposal Evaluation Committee – Organic Farming; Chairman |

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

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| **Dates** | **Description** |
| 2000 | Organizer of an International Conference, World Congress on Soilless Culture on 'Agriculture in the Coming Millennium'; Place – Ma'ale Hachamisha, Israel |
| 2005-2006 | Scientific committee: ' HortiModel2006: Models for Plant Growth, Environmental Control and Farm Management in Protected Cultivation; Place – The Volcani Center, Israel |
| 2010 | Organizer: UK-Israel binational Workshop on sustainable agriculture; Place – The Volcani Center, Israel |
| 2013 | Organizer: Italy-Israel binational Workshop on sustainable agriculture; Place – The Volcani Center, Israel |
| 2015 | Member of the International Advisory Committee of The 5th symposium on Applications of Modelling as an Innovative Technology in the Horticultural Supply Chain, Wageningen, The Netherlands |
| 2015 | Organizer of an International Workshop on NanoParticles in Agriculture; Place – The Volcani Center, Israel |

1. National:

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| **Dates** | **Description** |
| 1995-1996 | The executive committee of the Israeli Society of Soil Science; Member |
| 2004-2006 | Scientific executive committee of ARO; Member |
| 2009-2011 | The seminar program of the Institute of Soil, Water & Environmental Sciences; Coordinator |
| 2013-to date | The executive committee of the Israeli Society of Soil Science; Member |
| 2014 | The annual meeting of the Israeli society of soil science; Organizer |

1. Editorial responsibilities:

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| **Dates** | **Description** |
| 2000 | Co-Editor of Acta Horticulturae volume “World Congress on Soilless Culture on 'Agriculture in the Coming Millennium'. |
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1. Active Participation in Meetings
2. International:

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| --- | --- | --- | --- |
| **Date** | **Title of the Meeting** | **Place** | **Role** |
| 1989 | British Israeli symposium on transport processes in soil | Oxford, UK | Invited Speaker |
| 1990 | CALARII Workshop: protected crops in Mediterranean climate | San Diego, CA; USA | Invited lecture |
| 1992 | CALARII Workshop: protected crops in Mediterranean climate | Beer-Sheva, Israel | Invited lecture |
| 1993 | International symposium on new cultivation systems in greenhouse | Cagliari, Italy | lecture |
| 1993 | CALARII Workshop: protected crops in Mediterranean climate | Alexandria, Egypt | Invited lecture |
| 1994 | CALARII Workshop: protected crops in Mediterranean climate | San Diego, CA; USA | Invited lecture |
| 1994 | International conference on modern agriculture and the environment | Rehovot, Israel | Lecture |
| 1995 | ISHS symposium on strategies for market oriented greenhouse production | Alexandria, Egypt | Invited lecture |
| 1996 | Second international symposium on the biology of root formation and development | Jerusalem, Israel | Lecture |
| 1997 | Symposium on ions in the Soil-Water-Plant continuum | Perth, WA, Australia | Lecture |
| 1998 | Third international workshop on models for plant growth and control of the shoot and root environments in greenhouses | Bet-Dagan, Israel | Lecture |
| 2000 | World Congress on Soilless Culture on 'Agriculture in the Coming Millennium' | Ma'ale Hachamisha, Israel | Lecture |
| 2001 | International workshop on water-saving agriculture in dryland areas | Yangling, China | Invited lecture |
| 2003 | International ISHS symposium on managing Greenhouse crops in saline environment | Pisa, Italy | Poster |
| 2003 | The international fertilizer society, Dahlia Greidinger symposium on nutrient, substrate and water management in protected cropping systems | Izmir, Turkey | Invited lecture |
| 2005 | The XV international plant nutrition colloquium | Beijing, China | Invited lecture |
| 2005 | China agricultural engineering conference | Beijing, China | Invited lecture |
| 2006 | World congress of soil science | Philadelphia, PA, USA | Poster |
| 2007 | International symposium on dynamic of soil organic matter | Poitiers, France | Poster |
| 2010 | Integrated international water resource management | Amman, Jordan | Invited lecture |
| 2010 | The annual meeting of the European Geological Union (EGU) | Vienna, Austria | Invited lecture |
| 2010 | the 5th international nitrogen conference | New Delhi, India | Invited lecture |
| 2012 | The kickoff meeting of the EU-FP7 Project: BIOEFFECTOR | Stuttgart, Germany | Invited lecture |
| 2012 | The kickoff meeting of the Bi-National Italy-Israel sustainable agriculture | Italy | Invited lecture |
| 2013 | The second meeting of the EU-FP7 Project: BIOEFFECTOR | Doublin, Ireland | Invited lecture |
| 2013 | The second meeting of the Bi-National Italy-Israel sustainable agriculture | Bet-Dagan, Israel | Invited lecture |
| 2013 | The 11th Dahlia Greidinger memorial symposium: advanced methods for investigating nutrient dynamics in soil and ecosystems | Haifa | Lecture and Panel discussion |
| 2014 | The third meeting of the EU-FP7 Project: BIOEFFECTOR | Sorrento, Italy | Invited lecture |
| 2014 | The second meeting of the Bi-National Italy-Israel sustainable agriculture | Rome. Italy | Invited lecture |

1. National:

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| **Date** | **Title of the Meeting** | **Role** |
| 2005 | The annual meeting of the Israeli society of soil science | Invited lecture |

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

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| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Granting Source** | **Duration (years)** | **Role\*** | **Title (short)** | **Budget (US $ / year)** | |
| **Total** | **Researcher** |
| 1990 | CALARII-AID | 5 | CI | Fertigation of protected tomato | 500,000 | 20,000 |
| 1996 | DIARP- Israel-the Netherland | 3 | PI | Rose flower quality improvement through Ca fertigation | 120,000 | 60,000 |
| 1999 | CIARP- Israel-China | 2 | CI | Improvement of crop quality of cucumber and pepper through fertigation | 40,000 | 20,000 |
| 2001 | BARD -Texas Israel | 3 | CI | Optimizing water use and production efficiency to enhance pepper quality | 150,000 | 30,000 |
| 2003 | CDR-AID | 3 | PI | Effect of chickpea-wheat rotation on yield and soil productivity | 70,000 | 30,000 |
| 2004 | BARD | 3 | PI | Effects of soil properties and organic residues management on C sequestration and N losses | 110,000 | 55,000 |
| 2011 | Bi-National Italy-Israel | 3 | PI | Improving agriculture productivity through sustainable soil management | 120,000 | 55,000 |
| 2012 | EU-FP7 | 5 | LPI | Resources preservation by application of Bioeffectors in European crop production | 1,500,000 | 56,000 |
| 2014 | BARD | 3 | PI | Optimization of advanced greenhouse substrates | 102,000 | 51,000 |

\*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** |
| 1990 | Sigram | 1 | PI | Kinetics of K-Ca exchange on clays | 10,000 | 10,000 |
| 1994 | Chief Sci. | 1 | CI | Determination of optimal nitrogen need of fruit trees for decreasing of nitrate damage to the environment | 25,000 | 13,000 |
| 1994 | Chief Sci. | 3 | CI | Use of sewage of secondary treatment levels to irrigate orchards | 24,000 | 10,000 |
| 1994 | Chief Sci. | 3 | CI | Optimization of roses fertigation: Calcium | 30,000 | 15,000 |
| 1994 | Chief Sci. | 3 | PI | Changes in root morphology to increase the efficiency of water, phosphorous and potassium uptake | 20,000 | 10,000 |
| 1994 | Chief Sci. | 3 | CI | Production of high quality tomato fruits by using saline water | 25,000 | 12,500 |
| 1995 | Chief Sci. | 3 | PI | Development of fertigation of greenhouse pepper for improving fruit quality | 30,000 | 15,000 |
| 1998 | Chief Sci. | 3 | CI | Environmental Factors controlling Blossom End Rot in greenhouse pepper | 33,000 | 16,500 |
| 1998 | Chief Sci. | 3 | CI | Use of sewage of secondary treatment levels to irrigate orchards | 27,000 | 13,500 |
| 1999 | Chief Sci. | 3 | PI | Development of sound environmental management for long term application of effluent and sludge in agriculture | 25,000 | 12,500 |
| 1999 | Chief Sci. | 3 | CI | Fertilization of a new crop from the southern hemisphere | 27,000 | 13,500 |
| 1999 | Chief Sci. | 3 | CI | Fertigation with continuous micro  drip irrigation | 27,000 | 13,500 |
| 2002 | Chief Sci. | 3 | PI | Long term effects of irrigation management with effluents on grapefruit orchard | 27,000 | 19,000 |
| 2002 | Chief Sci. | 3 | CI | Effect of sludge and purified sewage water application on field crops | 50,000 | 10,000 |
| 2002 | Chief Sci. | 3 | CI | Application of effluents for irrigation of rose plants in soilless culture | 73,000 | 29,000 |
| 2003 | Chief Sci. | 3 | PI | Identifications of the factors for yield decline in Bet Shaan Valley | 80,000 | 40,000 |
| 2003 | Chief Sci. | 3 | PI | Persimmon Irrigation with effluent water | 87,000 | 66,000 |
| 2005 | Chief Sci. | 3 | CI | The effect of Mn on pepper growth and the incidence of blossom end rot. | 80,000 | 20,000 |
| 2006 | Chief Sci. | 3 | CI | Chives response to recycling of the irrigation water | 80,000 | 20,000 |
| 2006 | Chief Sci. | 3 | CI | Using desalination water for irrigation of flowers and vegetables. | 80,000 | 20,000 |
| 2006 | Chief Sci. | 3 | CI | Response of stone fruit rootstocks adapting to irrigation with reclaimed sewage water | 80,000 | 20,000 |
| 2007 | Chief Sci. | 3 | CI | Transport and distribution of radio-nucleotides from irrigating water in plants | 60,000 | 20,000 |
| 2007 | Chief Sci. | 3 | CI | Updating the management of fertilization of nitrogen in citrus orchards in Israel | 60,000 | 30,000 |
| 2007 | Chief Sci. | 1 | CI | The potassium and ammonium balance in soil | 15,000 | 5,000 |
| 2007 | Chief Sci. | 3 | CI | Cover crops in orchards as a tool for weed management, regulation of nitrogen level and water conservation | 75,000 | 37,500 |
| 2008 | Chief Sci. | 3 | CI | Sulfate Fertilization of tomato plants irrigated with desalinized water | 100,000 | 30,000 |
| 2008 | Chief Sci. | 3 | PI | The effects of soil management on the fate of carbon and nitrogen from applied organic residues | 40,000 | 40,000 |
| 2009 | Chief Sci. | 3 | PI | The effects of growth medium volume on the growth of an indicator plant in intact substrate | 60,000 | 23,000 |
| 2009 | Chief Sci. | 3 | CI | A long term research for understanding the effects of organic management on soil fertility | 75,000 | 10,000 |
| 2010 | Chief Sci. | 3 | CI | Pepper response to nitrogen under varied water quality. For 3 years. | 42,000 | 10,000 |
| 2010 | Chief Sci. | 3 | CI | Application of nitrogen in agricultural fields in regard to nitrate concentration in groundwater | 40,000 | 10,000 |
| 2011 | Chief Sci. | 3 | CI | Optimization of biosolids application in field crops rotation. | 40,000 | 10,000 |
| 2011 | Chief Sci. | 3 | CI | Organic Pollutants in Reclaimed Wasterwater and Sludge: Fate in the Agro-Environment | 210,000 | 33,000 |
| 2012 | Chief Sci. | 3 | PI | Effects of agricultural management and environmental factors on GHG emissions from soil in organic agriculture | 40,000 | 40,000 |
| 2012 | Chief Sci. | 3 | PI | Investigating soil degradation due to long term irrigation with effluents and their effects on orchards | 103,000 | 33,000 |
| 2014 | Chief Sci. | 3 | PI | A long term research for understanding the effects of organic management on soil fertility | 82,000 | 33,000 |
| 2014 | Chief Sci. | 4 | CI | Reduction of nitrate fluxes to ground water from agricultural fields | 185,000 | 27,500 |

\*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** |
| 1991 | Dead Sea Works | 2 | PI | potassium sulfate fertilizer | 20,000 | 10,000 |
| 1992 | Negev Phosphates | 1 | PI | Corn response to composite fertilizers of P, K and S | 25,000 | 10,000 |
| 2006 | Keren Hayesod | 2 | PI | Improving fertilization efficiency and tillage management in rain-fed cotton | 45,000 | 22,500 |
| 2008 | Katan Group | 1 | CI | Irrigation and fertilization guidelines for the biodiesel crops | 1,000,000 | 100,000 |
| 2010 | JAT Fuel | 4 | CI | Irrigation and fertilization guidelines for the biodiesel crops | 250,000 | 25,000 |
| 2011 | SAB Mozambique | 3 | CI | Development of Jatropha curcas as an oil crop | 330,000 | 33,000 |

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

1. **Awards**

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| **Dates** | **Description** |
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# Asher Bar-Tal December 2014

##### Part II: LIST OF PUBLICATIONS

Marks:

S Student or post-doc under my supervision

\* Equal contribution

1. **Articles in Reviewed Journals**

1.  Hass, J.A., **Bar‑Tal, A.** and Bar‑Yosef, B. (l986).

Nutrient availability effects on vesicular‑arbuscular mycorrhizal bell pepper (*Capsicum annuum*) seedlings and transplants.

*Ann. Appl. Biol*. l08: l7l‑l79. IF 1.955; Category: Agriculture, Multidisciplinary; Rank 6/56

2. **Bar‑Tal, A.**,Bar‑Yosef, B. and Chen, Y. (l988).

Effects of Fulvic acid and pH on Zinc sorption on Montmorillonite.

*Soil Sci.* l46: 367‑373. IF 1.144; Category: Soil Science; Rank 22/33

3. Seyfried, M.S., Sparks, D.L., **Bar‑Tal, A.** and Feigenbaum, S. (l989).

Kinetics of Ca‑Mg exchange on soil using a stirred‑flow reaction chamber.

*Soil Sci. Soc. Am. J.* 53:406‑410. IF 2.00; Category: Soil Science; Rank 13/34

4. **Bar‑Tal, A.**, Sparks, D.L., Pesek, J.D., and Feigenbaum, Sala. (1990).

Analysis of adsorption kinetics using a stirred‑flow chamber: I. Theory and experimental tests.

*Soil Sci. Soc. Am. J.* 54: 1273‑1278. IF 2.00; Category: Soil Science; Rank 13/34

5. Eick, M.J\*., **Bar‑Tal, A\*.**, Sparks, D.L. and Feigenbaum Sala. (1990).

Analysis of adsorption kinetics using a stirred‑flow chamber: II. Potassium - calcium exchange on clay minerals.

*Soil Sci. Soc. Am. J.* 54:1278‑1282. IF 2.00; Category: Soil Science; Rank 13/34

6. **Bar‑Tal, A.**, Bar‑Yosef, B. and Kafkafi, U. (l990).

Pepper seedling response to steady and transient nitrogen and phosphorus supply.

*Agron. J.* 82:600‑606. IF 1.79; Category: Agronomy; Rank 18/79

7. **Bar‑Tal, A.**, Bar‑Yosef, B. and Kafkafi, U. (l990).

Pepper transplant response to root volume and nutrition in the nursery.

*Agron. J.* 82:989‑994. IF 1.79; Category: Agronomy; Rank 18/79

8. Feigenbaum, Sala\*., **Bar‑Tal, A\*.**, Portnoy, R. and Sparks, D.L. (l991).

Binary and ternary exchange of potassium on calcareous montmorillonitic soils.

*Soil Sci. Soc. Am. J.* 55: 49‑56. IF 2.00; Category: Soil Science; Rank 13/34

9. **Bar‑Tal, A.**, Feigenbaum Sala, and Sparks, D.L. (1991)

Potassium‑Salinity interactions in irrigated corn.

*Irrig. Sci.* 12: 27‑35. IF 2.84; Category: Water Resources; Rank 6/79

10. **Bar‑Tal, A.**, Bar‑Yosef, B. and Chen, Y. (1991).

Validation of a model of the transport of zinc to artifical roots.

*J. Soil Sci.*42:399‑411. IF 2.39; Category: Soil Science; Rank 8/34

11. **Bar‑Tal, A.**, Bar‑Yosef, B. and Kafkafi, U. (1993).

Modeling pepper seedling growth and nutrients uptake as a function of cultural conditions.

*Agronomy J.* 85:718-724. IF 1.79; Category: Agronomy; Rank 18/79

12. **Bar‑Tal, A.**, Feigin, A., Rylski, Irena and Pressman, E. (1994)

Effects of root pruning and N‑NO3 solution concentration on nutrients uptake and transpiration of tomato plants.

*Scientia. Hort.* 58:77-90. IF 1.53; Category: Horticulture; Rank 8/31

13. **Bar‑Tal, A.**, Feigin, A., Rylski, Irena and Pressman, E. (1994).

Effects of root pruning and N‑NO3 solution concentration on tomato plant growth and fruit yield.

*Scientia. Hort.* 58:91-103. IF 1.53; Category: Horticulture; Rank 8/31

14. **Bar‑Tal, A.**, Eick, M.J., Feigenbaum, S., Sparks, D.L. and Fishman, S. (1995). Determination of rate coefficients for potassium- calcium exchange on vermiculite using a stirred-flow chamber.

*Soil Sci. Soc. Am. J.* 59:760-765. IF 1.98; Category: Soil Science; Rank 8/33

15. **Bar‑Tal, A.**, Feigin, A., Sheinfeld, S., Rosenberg, R., Sternbaum, B., Rylski, Irena and Pressman, E. (1995)

Root restriction and N-NO3 solution concentration effects on nutrient uptake, transpiration and dry matter production of tomato.

*Scintia. Hort.* 63:195-208 IF 1.53; Category: Horticulture; Rank 8/31

16. **Bar‑Tal, A.**, and Pressman, E. (1996)

Root restriction and K and Ca solution concentration affect dry matter production, cation uptake, and blossom end rot in greenhouse tomato.

*J. Am. Soc. Hort. Sci.* 121:649-655 IF 0.94; Category: Horticulture; Rank 11/31

17. Pressman, E., **Bar‑Tal, A.**, Shaked, R., and Rosenfeld, K. (1997)

The development of tomato root system in relation to the carbohydrate status of the whole plant.

*Ann. Bot.* 80:533-538 IF 4.03; Category: Plant Science; Rank 19/190

18. Karni, L., Aloni, B., **Bar-Tal, A.**, Mareshet, S., Keinan, M. and Yao, C. (2000)

The effect of root restriction on the incidence of blossom-end rot in bell pepper (Capsicum annuum L.).  
*J. Hort. Sci. and Biotech.* 75:364-369 IF 0.64; Category: Horticulture; Rank 18/31

19. **Bar-Tal, A.,** Aloni, B., Karni, L. and Rosenberg, R. (2001)

Nitrogen nutrition of greenhouse pepper: I. Effects of Nitrogen concentration and NO3:NH4 ratio on yield, fruit shape, and the incidence of blossom-end rot in relation to plant mineral composition.

*HortScience* 36:1244-1251 IF 0.78; Category: Horticulture; Rank 14/31

20. **Bar-Tal, A.,** Aloni, B., Karni, L., Oserovitz, J.s, Hazan, A., Itach, M., Avidan, A., Posalski, I. and Rosenberg, R. (2001)

Nitrogen nutrition of greenhouse pepper: II. Effects of Nitrogen concentration and NO3:NH4 ratio on growth, transpiration, and nutrient uptake.

*HortScience* 36:1252-1259 IF 0.78; Category: Horticulture; Rank 14/31

21. **Bar-Tal, A.,** Baas, R., Ganmore-Neumann, R., Dik, A., Marissen, N., Silber, A., Davidov, S., Hazan, A., Kirshner, B.and Elad, Y. (2001)

Rose flower production and quality as affected by Ca concentration in the petal.

*Agronomie* 21, 393-402 IF 3.33; Category: Agronomy; Rank 4/79

22. Asseng, S., **Bar-Tal, A.,** Bowden, J.W., Keating, B.A., Van Herwaarden, Palta, J.A., Huth, N. and Probert, E.M. (2002)

Simulation of grain protein content with APSIM-Nwheat.

*Eur. J. of Agron.* 16:25-42 IF 2.48; Category: Agronomy; Rank 9/79

23. Silber, A., Ben-Jaacov, J., Ackerman, A., **Bar-Tal, A.,** Levkovitch, I.,Matsevitz-Yosef, T.,Swartzberg, D., Riov, J. and Granot, D. (2002)

Interrelationship between phosphorus toxicity and sugar metabolism in Verticordia plumose L.

*Plant and Soil* 245:249-260 IF 3.235; Category: Soil Science; Rank 3/34

24. Baas, R., van Oers, S., Silber, A., Bernstein, N., Ioffe, M., Keinan, M. and **Bar-Tal, A.** (2003)

Calcium distribution in cut roses as related to transpiration.

*J. Hort. Sci. and Biotech.* 78: (6)1-9. IF 0.64; Category: Horticulture; Rank 18/31

25. **Bar-Tal, A.**, Yermiyahu, U., Beraud, J., Keinan, M., Rosenberg, R., Zohar, D., Rosen, V. and Fine, P. (2004).

N, P and K uptake by wheat and their distribution in soil following successive annual application of composts.

*J. Envir. Qual.* 33:1855-1865. IF 2.32; Category: Environmental Sciences; Rank 61/205

26. Beraud, Js. Fine, P., Keinan, M., Rosenberg, R., Hadas A. and **Bar-Tal, A.** (2005)

Modeling carbon and nitrogen transformations for adjusting compost application with N consumption by wheat.

*J. Envir. Qual.* 34:664-675. IF 2.32; Category: Environmental Sciences; Rank 61/205

27. Aktas, H.,Karni, L., Chang, D.C., Turhan, E., **Bar-Tal, A.,** and Aloni, B. (2005)

The suppression of salinity-associated oxygen radicals production, in pepper (*capsicum annuum* L.) fruit, by manganese, zinc and calcium in relation to its sensitivity to blossom-end rot.

*Physiol. Plant.* 123:67-74 IF 3.11; Category: Plant Sciences; Rank 28/190

28. Bernstein N., **Bar-Tal A**., Friedman H., Snir P., Chazan A., Ioffe M. (2006)

Application of treated wastewater for cultivation of roses (*Rosa hybrida*) in soil-less culture.

*Sci. Hort.* 108:185-193 IF 1.53; Category: Horticulture; Rank 8/31

29. **Bar-Tal, A.,** Aloni, B., Arbel, A., Barak, M., Karni, L., Oserovitz, J., Hazan, A., Gantz, S. Avidan, A., Posalski, I. and Keinan, M. (2006)

Effects of evaporating cooling system on the incidence of blossom-end rot and fruit cracking in bell pepper (*capsicum annuum* L.).

*J. Hort. Sci. and Biotech.* 81:599-606 IF 0.64; Category: Horticulture; Rank 18/31

30. Turhan, E., Karni, L., Aktas, H., Deventurero, G., Chang, C. C., **Bar-Tal, A.** and Aloni, B. (2006)

Apoplastic antioxidants in pepper *(Capsicum annuum* L*.*) fruit and their relationship to blossom-end rot.

*J. Hort. Sci. and Biotech.* 81:661-667 IF 0.64; Category: Horticulture; Rank 18/31

31. Turhan, E., Aktas, H., Deventurero, G., Karni, L., Silber, A., **Bar-Tal, A.** and Aloni, B. (2006)

Blossom-end rot is associated with impairment of sugar uptake and metabolism in pepper (*Capsicum annuum* L.) fruits.

*J. Hort. Sci. and Biotech.* 81:921-927 IF 0.64; Category: Horticulture; Rank 18/31

32. Weinberg, Z.G., **Bar-Tal, A.,** Chen, Y., Gamburg, M. Brener, S., Dvash, L., Markovitz, T. and Landau, Y.S. (2007)

The effect of irrigation and nitrogen fertilization on the ensiling of safflower.

*Animal Feed Sci. and Tech.* 134:152-161 IF 1.69; Category: Agriculture, Dairy & Animal Science; Rank 10/55

**Since previous promotion**

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Rethinking desalinated water quality and agriculture.

*Science* 318:920-921 IF 31.2; Category: Multidisciplinary Sciences; Rank 2/59

34. Bhardwaj, A.K., Mandal, U.K., **Bar-Tal, A.,** Gilboa, A. and Levy, G.J. (2008)

Replacing saline-sodic irrigation water with treated wastewater: Effects on saturated hydraulic conductivity, slaking, and swelling.

*Irrig. Sci.* 26:139-146 IF 2.84; Category: Water Resources; Rank 6/79

35. Mandal, U.K., Warrington, D.N., Bhardwaj, A.K., **Bar-Tal, A.,** Kautzky, L., Minz, D. and Levy, G.J. (2008)

Evaluating impact of irrigation water quality on a calcareous clay soil using principal component analysis.

*Geoderma* 144:189-197 IF 2.51; Category: Soil Science; Rank 5/34

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Boron deficiency and toxicity in persimmon (Diospyrus kaki L.).

*J. Hort. Sci. and Biotech.* 83:469-473 IF 0.64; Category: Horticulture; Rank 18/31

37. **Bar-Tal, A.,** Landau, Y.S., Li-xin, Z., Markovitz, T., Keinan, M., Dvash, L.,Brener, S. and Weinberg, Z.G. (2008)

Fodder quality of safflower across an irrigation gradient and nitrogen rates.

*Agron. J.* 100:1499-1505. IF 1.79; Category: Agronomy; Rank 18/79

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Irrigation with treated wastewater vs. saline-sodic water: effects on soil hydraulic conductivity, infiltration, runoff and interrill erosion.

*Geoderma* 144:509-516 IF 2.51; Category: Soil Science; Rank 5/34

39. Bernstein, N., Guetsky, R., Friedman, H., **Bar-Tal, A.,** and Rot, I. (2008)

Monitoring bacterial populations in agricultural greenhouse production system irrigated with reclaimed wastewater.

*J. Hort. Sci. Biotech.* 83:821-827 IF 0.64; Category: Horticulture; Rank 18/31

40. Silber, A\*. **Bar-Tal, A\*.,** Levkovitch, I., Bruner, M., Yehezkel, H., Shmuel, D., Cohen, S., Matan, E., Karni, L., Aktas, H., Turhan, E. and Aloni, B. (2009)

Manganese nutrition of pepper (*Capsicum annuum* L.): growth, Mn uptake and fruit disorder incidence.

*Sci. Hort.* 123:197-203 IF 1.53; Category: Horticulture; Rank 8/31

42. Danga, B. Os., Ouma, J. P., Wakindiki, I. C., and **Bar-Tal, A.** (2010)

Chickpea - Wheat rotation for higher production in a humid tropical region.

*Agron. J.* 102:363-371 IF 1.79; Category: Agronomy; Rank 18/79

43. Heller, Hs., **Bar-Tal, A.**, Tamir, G., Venterea, R.T., Chen, D., Zhang, Y., Clapp, E.C., Bloom, P., and Fine, P. (2010)

Effects of manure and cultivation on CO2 and N2O emissions from a corn field under Mediterranean conditions**.**

*J. Envir. Qual.* 39:437-448 IF 2.32; Category: Environmental Sciences; Rank 61/205

44. Antil, R.S\*., **Bar-Tal, A\*.**, Fine, P.,and Hadas, A. (2011)

Predicting nitrogen and carbon mineralization of composted manure and sewage sludge in soil.

*Compost Sci. Util.* 19:33-43 IF 0.64; Category: Soil Science; Rank 28/33

45. Tamir, Gs., Shenker, M., Heller, H., Bloom, P.R., Fine, P. and **Bar-Tal, A**. (2011)

Can soil carbonate dissolution lead to overestimation of soil respiration?

*Soil Sci. Soc. Am. J.* 75:1414-1422 IF 2.00; Category: Soil Science; Rank 13/34

46. Elifantz, H., Kuatzky, L., Mor-Yosef, M., Tarchitzky, J., **Bar-Tal, A.**, Chen, Y. and Minz, D. (2011)

Microbial activity and organic matter dynamics during 4 years of irrigation with treated wastewater.

*Microb. Ecol.* 62:973-981 IF 2.91; Category: Microbiology; Rank 45/112

47. Lado, M., **Bar-Tal, A\*.** Azenkot, A. Assouline, S., Ravina, I., Erner, Y., Fine, P., Dasberg, S. and Ben-Hur, M.(2012**)**

Changes in chemical properties of semiarid soils under long-term secondary-treated wastewater irrigation.

*Soil Sci. Soc. Am. J.* 76:1358-1369 IF 2.00; Category: Soil Science; Rank 13/34

48. Tamir, Gs., Shenker, M., Heller, H., Bloom, P.R., Fine, P. and **Bar-Tal, A**. (2012)

Dissolution and re-crystallization processes of active CaCO3 in soil developed on tufa.

*Soil Sci. Soc. Am. J.* 76:1606-1613 IF 2.00; Category: Soil Science; Rank 13/34

49. Tamir, Gs., Shenker, M., Heller, H., Bloom, P.R., Fine, P. and **Bar-Tal, A**. (2013)

Organic N mineralization and transformations in soils treated with an animal waste in relation to carbonates dissolution and precipitation.

*Geoderma* 209-210:50-56 IF 2.51; Category: Soil Science; Rank 5/34

50. Kurtzman, D., Shapira, R., **Bar-Tal, A.**, Fine, P. and Russo, D. (2013)

Nitrate fluxes to groundwater under citrus orchards in a Mediterranean climate: observations, calibrated models, simulations and agro-hydrological conclusions.

*J. Cont. Hydrology* 151:93-104 IF 2.54: Category: Water Resources; Rank 9/78

51. Danga, B. Os., Hadas, A., Ouma, J. P., Wakindiki, I. C. and **Bar-Tal, A.** (2013)

Chickpea residue properties controlling decomposition dynamics and N availability in some tropical acid soils.

*South Afr. J. of Plant and Soil* 30(4):203-212 Category: Soil Science;

52. Heller, H., **Bar-Tal, A.**, Assouline, S., Narkis, K., Suryano, S., de la Forge, A., Barak, M., Alon, H., Bruner, M., Cohen, S. and Tsohar, D. (2014)

The effects of container geometry on water and heat regimes in soilless culture: lettuce as a case study.

*Irrig. Sci.* (in press) IF 2.84; Category: Water Resources; Rank 6/79

**Five selected Publications**

Publication 42: <https://www.agronomy.org/publications/aj/abstracts/102/2/363>

Publication 43 <https://www.agronomy.org/publications/jeq/abstracts/39/2/437>

Publication 45 <https://www.soils.org/publications/sssaj/abstracts/75/4/1414>

Publication 47 <https://www.soils.org/publications/sssaj/abstracts/76/4/1358>

Publication 49 <http://www.sciencedirect.com/science/article/pii/S0016706113001985>

1. **Books and Invited Reviews**

**Since previous promotion**

1.Levy, G., Fine, P. and **Bar-Tal, A.** (eds) (2011)

Use of treated waste water in agriculture: impact on soil environment and crop

Wiley-Blackwell. UK pp.

2. Danga, B. Os., Ouma, J. P., Wakindiki, I. C., and **Bar-Tal, A.** (2009)

Legume-Wheat Rotation Effects on Residual Soil Moisture, Nitrogen and Wheat Yield in Tropical Regions.

*Adv. Agron.* 101:315-349 IF 5.20; Category: Agronomy; Rank 1/79

3. Halpern, Ms., **Bar-Tal, A.**, Ofek, M., Minz, D., Muller, T. and Yermiyahu, U. (2014)

The use of biostimulants for enhancing nutrient uptake.

*Adv. Agron.* (in press) IF 5.20; Category: Agronomy; Rank 1/79

1. **Book Chapters**

1. **Bar‑Tal, A**. (1999)

The significance of root size for plant nutrition in intensive horticulture.

In: *Mineral Nutrition of Crops: Fundmental Mechanisms and Implications.* (Z. Rengel, ed.), p 115-139. Food Product Press, The Haworth Press, Inc. NY, USA.

2. Raviv, M. Wallach, R. Silber, A. and **Bar-Tal, A**. (2002)

Substrates and Their Analysis.

In: *Hydroponic Production of Vegetables and Ornamentals*. (D. Savvas and H.C. Passam, eds.) p 25-102. Embryo Publications. Athens, Greece.

**Since previous promotion**

3. Silber, A. and **Bar-Tal, A.** (2008)

Nutrition of Substrates-Grown Plants.

In: *Soilless Culture: Theory and Practice*. (M. Raviv and J.H. Lieth, eds.) pp 291-339. Elsevier, The Netherlands

4. Papadopoulos, A.P., **Bar-Tal, A.**, Silber, A., Saha, U.K. and Raviv, M. (2008)

Inorganic and Synthetic Organic Components of Soilless Culture and Potting Mixes.

In: *Soilless Culture: Theory and Practice*. (M. Raviv and J.H. Lieth, eds.) pp 505-543. Elsevier, The Netherlands

5. Raviv, M., Lieth, J.H., **Bar-Tal, A.** and Silber, A. (2008)

Growing plants in soilless culture: Operational conclusions.

In: *Soilless Culture: Theory and Practice*. (M. Raviv and J.H. Lieth, eds.) pp 545-571. Elsevier, The Netherlands

6. **Bar-Tal, A.** Bar-Yosef, B., Eshel, G. and Singer, M.J.(2011)

Major minerals.

In: *Use of Treated Waste Water in Agriculture: Impacts on Soil Environment and Crop.* (G. Levy, P. Fine and A. Bar-Tal, eds.) pp. 129-215. Wiley-Blackwell, UK.

7. Vaknin, Y., Yrmiyahu, U. and **Bar-Tal, A.** (2014)

*Jatropha curcas* L. as a new biofuel feedstock for semi-arid and arid regions and its agro-ecological sustainability issues.

In: *Sustainable Biofuels Paradigm: An Ecological Assessment of the Future Energy.* (A. K. Bhardwaj, T. Zenone, and  J. Chen, eds.) pp 86-216. The Ecosystem Science and Application (ESA) Series. Higher Education Press (HEP) in China and De Gruyter in Germany. (in press)

8. **Bar-Tal, A.**, Yermiyahu, U., Ben-Gal, A., Fine, P. and Hass, A. (2014)

Practices that simultaneously optimize water and nutrients use efficiency: Israeli experiences in fertigation and irrigation with treated waste water.

In: *The Links Between Fertilizers Use and Water Management*. (P. Heffer, ed.) IFA/IWMI/IPNI Scientific Publication. (in press)

1. **Articles in Reviewed Journals in Hebrew**

1. Aloni, B., Karni, L., **Bar‑Tal, A**. and Moreshet, S. (l999)

The factors that influence the incidence of physiological disorders in pepper fruit and the means to reduce the damage.

*Gan Sadehh Vameshek* 12:54-58 (Hebrew)

1. **Articles in Non-Reviewed Journals in Hebrew and English**

1. **Bar‑Tal, A.**, Bar‑Yosef, B., Kafkafi, U., Aloni, B. and Rylski, Irit. (l986)

Effects of nutrient solution level on bell pepper speedlings and fruit yield.

*Hassade* 66: 48l‑484 (in Hebrew).

2. **Bar‑Tal, A.**, Bar‑Yosef, B., Kafkafi, U., Aloni, B. and Rylski, Irit (l986)

Influence of root system volume and nitrogen level on the growth of bell pepper transplants and on fruit yield in the field.

Hassade 66: 690‑694 (in Hebrew)

3. **Bar‑Tal, A.**, Rosenberg, B., Aloni, B., Karni, L, and Sinvany, G., (l996)

The effects of nitrogen concentration and of ammonium/nitrate ratio on greenhouse – grown pepper crop. I. Mineral uptake, accumulation of dry matter and transpiration.

*Gan Sadehh Vameshek* 1996(9):25-29 (Hebrew)

4. Aloni, B., Karni, L, Sinvany, G., **Bar‑Tal, A.** and Rosenberg, B. (l996)

The effects of nitrogen concentration and of ammonium/nitrate ratio on greenhouse – grown pepper crop. II. Physiological disorders and percentage of export quality fruits.

*Gan Sadehh Vameshek* 1996(9):30-32 (Hebrew)

5. Aloni, B., Karni, L, Sinvany, G., **Bar‑Tal, A.** and Rosenberg, B. (l996)

The effects of nitrogen concentration and of ammonium/nitrate ratio on greenhouse – grown pepper crop. III. Chemical composition of the fruit.

*Gan Sadehh Vameshek* 1996(9):33-35 (Hebrew)

6. Itach, M., Osorovitz, J.s, Hazan, A., Avidan, A., Posalski, I., Tratkovski, N., Gantz, S., Aloni, B., and **Bar‑Tal, A.** (l998)

The effects of ammonium/nitrate ratio on the incidence of Blossom-End rot in pepper

*Gan Sadehh Vameshek* l998(6):39-41 (Hebrew)

7. Aloni, B., Karni, L., **Bar‑Tal, A.** and Arbel, A. (1999)

The effect of climate management in greenhouse on the incidence of blossom-end rot in pepper fruit.

*Gan Sadehh Vameshek* 1999 (12):56-59 (Hebrew)

8. Aloni, B., Karni, L., **Bar‑Tal, A.** and Moreshet, S. (2000)

The factors that control the incidence of blossom-end rot in pepper fruit.

*Gan Sadehh Vameshek* 2000(2):54-58 (Hebrew)

9. Oserovitz, J.s, **Bar‑Tal, A.**, Gantz, S., Hazan, A., Tratkovski, N., Aloni, B., Karni, L., Keinan, M., Suriano, S., Posalski, I. and Avidan, A. (2000)

The effects of irrigation frequency and Ca concentration on the incidence of blossom-end rot in greenhouse-grown pepper

*Gan Sadehh Vameshek* 2000(10):41-44 (Hebrew)

10. Keinan, M., **Bar‑Tal, A.** and Silber, A. (2000)

The effect of Ca concentration in the irrigation water on its concentration and distribution along the peduncle of roses.

*Dapei Maida* 16: 55-59

11. Oserovitz, J.s, **Bar‑Tal, A.**, Gantz, S., Hazan, A., Tratkovski, N., Aloni, B., Karni, L., Keinan, M., Suriano, S., Posalski, I. and Avidan, A. (2000)

The effects of P concentration and climate conditions on the incidence of blossom-end rot and fruit cracks in greenhouse-grown pepper.

*Gan Sadehh Vameshek* 2000(12):40-44 (Hebrew)

12. Oserovitz, J.s, Tratkovski, N., Gantz, S., Hazan, A., **Bar‑Tal, A.**, Keinan, M., Suriano, Aloni, B., Karni, L., Arbel, A., Barak, M., Posalski, I. and Avidan, A. (2001)

The effects of water availability and climate conditions on the incidence of blossom-end rot and fruit cracks in greenhouse-grown pepper.

*Gan Sadehh Vameshek* 2001(5):63-67 (Hebrew)

13. Keinan, M., Ganmore, R., Silber, A. **Bar‑Tal, A.**, Kirschner, B., Bar-David, D. and Elad, Y. (2001)

The effect of Ca and B concentrations in the irrigation water and night irrigation on Ca concentration in roses flower and the susceptibility to gray mould.

*Dapei Maida* (Hebrew)

14. Oserovitz, J.s, Gantz, S., Hazan, A., Posalski, I., Avidan, A. Tratkovski, N., **Bar‑Tal, A.**, Keinan, M., Suriano, S., Aloni, B., Karni, L., Arbel, A. and Barak, M. (2002)

Exploring the effects of three substrates, evaporating cooling system and four irrigation frequencies on growth of pepper in heated greenhouse.

*Gan Sadehh Vameshek* 2002(9):52-55 (Hebrew)

15. **Bar-Tal, A.**, Fine, P., Yofe, M., Keinan, M., Soriano, S., Markovitz, T., Erner, Y., Tagari, E., Artzi, B., Assouline, S., Hayimovitz, A., Rosner, M., Steinhardt, R. and Dasberg, S. 2003.

Long term effects of effluent irrigation management on the fruit yield and soil in grapefruit orchid in Ramat Hacovesh.

*Hanotea* 57:524-528 (Hebrew)

16. Ityel, E.s, **Bar-Tal, A.**, Ezri, R., Golan, R., Ofenbach, R. and Ezra, I. (2004)

The consumption of N, P and K by pepper in an unheated greenhouse in the Arava.

*Gan Sadehh Vameshek* 2004(1):35-39 (Hebrew)

17. Ityel, E.s, **Bar-Tal, A.**, Elkind, Y., Himnes, M., Golan, R., Ofenbach, R. and Ezra, I. (2004)

The effect of shading nets during winter on pepper fruit development in the Arava.

*Gan Sadehh Vameshek* 2004(1):40-42 (Hebrew)

18. Ityel, E.s, **Bar-Tal, A.**, Elkind, Y., Himnes, M., Golan, R., Elkayam, D., Tsabari, I., Ofenbach, R. and Ezra, I. (2004)

The effect of nutrition level and irradiation on fruit yield, dry matter production and nutrient uptake by pepper.

*Gan Sadehh Vameshek* 2004(3):42-46 (Hebrew)

19. Ityel, E.s, **Bar-Tal, A.**, Cohen, S., Rave, E., Elkind, Y., Himnes, M., Golan, R., Elkayam, D. and Tsabari, I. (2004)

The effect of reduced irradiation on water uptake of pepper grown in greenhouse in the Arava valley.

*Gan Sadehh Vameshek* 2004(5):33-35 (Hebrew)

20. Aloni, B., Karni, L., Pivonia, S., Levita, R. and **Bar-Tal, A.** (2005)

Chilling injury in pepper fruits.

*Gan Sadehh Vameshek* 2005(10):9-15 (Hebrew)

21. **Bar‑Tal, A.**, Fine, P., Beraud, J., Busak, A., Zohar, D., Lior, E., Keinan, M., Rosenberg, R. and Suryano, S. (2006).

Sludge as a substitute to fertilizers.

*Water and Irrigation* 471:20-32 (Hebrew)

**Since previous promotion**

22. Yermiyahu, U., **Bar‑Tal, A.**, Tarchiski, J. and Bruner, M. (2007).

Irrigation with desalinized water in the Negev: Disadvantages or advantages.

*Water and Irrigation* 471:20-32 (Hebrew)

23. Levy, G., Bhardwaj, A., Mandal, U., **Bar-Tal, A.,** Gilboa, A. and Ben-Hagai, N. (2007)

Effects of irrigation with treated wastewater on the stability of soil structure.

*Water and Irrigation* 486:14-19 (Hebrew)

24. **Bar-Tal, A.**, Yermiyahu, U., Keinan, M., Markovitz, T., Suryano, S., Faingold, I., Benedick, E., Ziv, J. and Avidor, Z. (2008)

Irrigation of persimmon with treated waste water containing Boron.

*Yevul Si* 32:24-25. (Hebrew)

25. Levkovitch, I., **Bar-Tal, A.,** Suryano, S., Silber, A., Aloni, B., Karni, L., Bruner, M., Matan, E., Cohen, S., Yehezkel, H. and Shmuel, D., (2010)

The effect of Mn on the growth of and fruit quality of summer grown pepper.

*Sadeh VeYerek* 15:17-21 (Hebrew)

1. **Articles in Symposia Proceedings (including Acta Horticulturae)**

1.Feigenbaum, Sala., **Bar‑Tal, A.** and Sparks, D.L. (l990)

dynamics of soil potassium in multicationic systems. In "Development of K‑fertilizer recommendations" 22nd Colloquium of the International Potash Institute. p. 145‑161. IPI, Bern, Switzerland.

2. **Bar‑Tal, A.**, Feigin, A., Rylski, Irena and Pressman, E. (1993)

Root volume and solution NO3-N concentration effects on tomato dry matter production, fruit yield, NO3 uptake and transpiration.

Acta Horticulturae 361:294-301

3. **Bar‑Tal, A.**, Feigin, A., Rylski, Irena and Pressman, E. (1995)

Improvement of greenhouse tomato fruit quality by manipulation of root size and solution composition.

Acta Horticulturae 434:37-46

4. **Bar-Tal, A**., Fishman, S.,Aloni, B. and Genard, M. (1999)

Simulation of environmental effects on Ca content in pepper fruit.

Acta Horticulturae 507:253-262

5. **Bar-Tal, A.**, Oserovitz, J.s, Aloni, B., Keinan, M., Grantz, S., Hazan, A., Itach, M., Karni, L., Avidan, A., Posalski, I., and Tratkovski, N. (2001)

Relationships between blossom-end rot and water availability and Ca fertilization in Bell pepper fruit production.

Acta Horticulturae 554:97-104

6. **Bar-Tal, A.** (2001).

Principles and practice of fertigation in Israel.

Proceedings of the International Workshop on Water-Saving Agriculture in Dryland Areas. Yangling, China. 40-58.

7. **Bar-Tal, A**., Keinan, M., Suriano, S., Aloni, B., Karni, L., Cohen, S., Offenbach, R. and Maduel, A. (2003).

Managing of circulated nutrient solutions with saline water for pepper cultivation.

Acta Horticulturae 609:349-354

8. Aktas, H., Karni,, L., Aloni, B. and **Bar-Tal, A**. (2003)

[Physiological and biochemical mechanisms leading to Blossom-end rot in peppers growing in greenhouse in saline environment](#ALONI).

Acta Horticulturae 609:81-88

9. **Bar-Tal, A.** Aloni, B., Karni,, L. and Aktas, H. (2003)

Nutrition of protected fruit vegetables.

IFS Proceedings 528, The 2003 Dhalia Greidinger Symposium, December 2003. (185-204)

10.Erner, Y., **Bar-Tal, A.** Asulin, S. Tagari, E. Rozner, M. Keinan, M. and Katzir, I. (2004)

Subsurface drip irrigation with recycling water for citrus.

proc. int. soc. citriculture.

11.Weinberg, Z.G., Landau, S.Y., **Bar-Tal, A.,** Chen, Y., Gamburg, M, Brener, S. and Devash, L. (2005).

Ensling safflower (*Carthamus tinctorius*) as an alternative winter forage crop in Israel. In R.S. Park and M.D. Stronge (eds.) "Silage production and utilization".

Proc. Of the XIV Int. Silage Conference. Wageningen Academic Pub.

12. Bar-Tal, A. Aloni, B., Arbel, A., Barak, A., Karni, L., Oserovitz, J.s, Hazan, A., Gantz, S. Avidan, A., Posalski, I. and Keinan, M. (2005)

The effects of pad and fan evaporating cooling system on pepper plants and fruit disorders.

The international symposium on innovation and development of urban agricultural engineering, Beijing, China.

13. **Bar-Tal, A**. Danga, B.O.s, Minz, D. Wakindiki, I.I.C., Ouma, J., Kautski, L., Suryano, S. and Hadas, A. (2006)

The effects of soil pH and microorganisms source on N mineralization and nitrification.

18th World Congress of Soil Science, July 9-15, 2006, Philadelphia, Pennsylvania, USA. 138-81.

14. **Bar-Tal, A.** and Aloni, B. (2006).

Effects of fertigation regime on blossom end rot of vegetable fruits.

International Symposium on Fertigation, Beijing, September 2005. International Potash Institute, Horgan, Switzerland.

**Since the previous promotion**

15. Bernstein N., **Bar-Tal A**., Friedman H., and Ioffe M. (2008).

Potential health risks associated with utilization of reclaimed wastewater for irrigation in a greenhouse production system.

Acta Horticulturae 797:327-332

## 16. Seligmann, R.s, Wengrowicz. U., Tirosh, D., Yermiyahu, U., **Bar-Tal, A.**, and Schwartz, A. (2009).

Calcium translocation and whole plant transpiration: Spatial and temporal measurements using radio-strontium as tracer. International Plant Nutrition Conference. Sacramento, CA, USA

17. Philosoph-Hadas, S., Perzelan, Y., Droby, S., Shtein, I., Salim, S., Meir, S., and **Bar-Tal, A.** (2013).

*Pittosporum* cut branches: Characterization and Prevention of the

Brown spots on the variegated leaves during growth and seatransport.

Acta Horticulturae 970:101-114

18. Stein, A., Yasuor, H., Bar-Tal, A., Cohen, S., Yermiyahu, U. (2013).

Pepper (*Capsicum annuum*) response to nitrogen as affected by salinity.

Proc. Int. Plant Nutr. Colloquium XVII. 496-497.

1. **Allowed Patents and Registered Cultivars**

**Asher Bartal November 2014**

Part III: DESCRIPTION OF MAJOR ACHIEVEMENTS

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

**Ions sorption, exchange and transport in soils**

Ions sorption/desorption and exchange on clay and soil minerals are important processes for nutrients availability to plants and for ions transport in soil. The study of kinetics of cation exchange on clay and soil minerals is important for understanding the mechanism of the exchange process and for prediction of ion transport. Since cation exchange is a rapid process, a unique method- the stirred flow-chamber was developed to determine the kinetic model and coefficients for such rapid exchange. In my postdoc training I presented a new approach to analyze the results obtained by the stirred‑flow chamber (Publications 1-3,4 and 5). I introduced an experimental technique to distinguish between instantaneous and time dependent reactions and an analytical solution that enabled determination of the kinetics coefficients (Publications 1-4 and 5). Partitioning of K between the liquid and solid phases is a very important factor in K availability to plants. Estimation of availability was based on binary K-Ca exchange models. However, this approach is over simplification in soils that contain high Na concentration. Therefore, an equation that includes ternary ions exchange system was developed and was shown to yield better predictions of K availability to plants under saline conditions (Publication 1-8, 1-9 and 6-1).

Soil organic matter, particularly fulvic acid (FA), plays a predominant role in the partitioning of Zn between the solid and liquid phases of soils. The soil solution pH influences Zn adsorption to the solid surface by determining the speciation of the Zn ions (Zn+2, ZnOH+ and Zn(OH)2) and by affecting the stability coefficient of FA-Zn. A quantitative description of pH and FA effects on Zn sorption to clay or soil was developed (Publications 1-2). This model was incorporated in a mechanistic model of Zn transport toward a single root and was evaluated by a unique experimental method using artificial roots (Publications 1-10). This technique allowed to evaluate the relative importance of various soil and root characteristics in Zn nutrition.

**Root system and Nutrients uptake**

The role of root in the uptake of nutrient and water by plant is well known, however, very little is known on the effect of root:shoot ratio on these processes. Root restriction has been shown to limit plant growth (Publications 1-6,7,12,13,15,16). Reduced available nutrient and water content in the restricted root growth medium was shown as the limiting factor of pepper seedlings in small volume pots (Publications 1-7 and 1-11). In the above mentioned studies the indirect effect of the pot volume could not discriminate from the direct effect of the root size and the root:shoot ratio. To this end further studies of root pruning and restriction of tomato plants in aero-hydroponic system were carried out and it was shown that water, N and K uptake are not the cause for the restricted shoot growth (Publications 1-12,13,15 and 16). Moreover, root restriction enhanced water, N and Ca uptake per unit root (Publications 1-12,16 and 18). The mechanisms of root system size effects on nutrient and water uptake have been reviewed in book chapters (Publications 3-1,3 and 5). Recently, we showed that the effects of the shape of the pot on water uptake and plant growth are related both to water holding curve, water transport and the medium temperature (Publication 1-52).

**Plants mineral nutrition and fruit physiological disorders**

Environmental conditions, water and nutrient uptake control physiological disorders of fruits. The effects of the solution composition (NH4:NO3 ratio, N, K and Ca concentrations) on fruit physiological disorders (mainly blossom-end rot (BER)) were investigated for tomato and pepper (Publication 1-16, 1-19 and 1-20). A unique effect of high NH4 concentration on the formation of flat pepper fruits was found (Publication 1-19). Quantitative prediction of the effects of environmental factors on pepper fruit growth and composition has been achieved by adapting a simulation model of fruit growth (Publication 6-4). A deeper insight and understanding of the biochemical processes involved in the development of BER has been gained through research on sugar metabolism (Publication 1-31) and oxygen radicals in the pepper fruit (Publications 1-27 and 1-30). A new hypothesis on the possible role of Mn in protecting the fruit from oxidative stress and BER incidence has been proposed (Publication 1-27). Since the previous promotion we found that Mn deficiency combined with heat stress induced severe pale spots and blemished fruits that were related to antioxidants production (Publications 1-40). The effects of environmental conditions and fertilization (Ca, K, Mg and NH4 concentrations) on BER in vegetable fruits have been reviewed by me in review papers and book chapters (Publications 3-3, 6-14). The distribution of Ca along the flowering stem of rose plant is unique, the lowest Ca concentrations are found in the oldest leaves on the bottom of the stem. We proved that this distribution can be explained by difference between top and bottom leaves in transpiration rate, conductivity resistance and stomata density (Baas et al., 2003). In a study conducted after the previous promotion, direct measurements employing radio-strontium (Sr) as a tracer indicated that Ca transport in tomato plant is indeed coupled with water and that Sr can be used as an analog to Ca in uptake studies (Publication 6-16, Seligman Ph.D. thesis).

**Fate of soil applied organic residues – measurements and prediction of C and N transformations and N availability to plants**

The complex system of the organic matter, soil and plant under different climate conditions requires a quantitative tool for establishing guidelines for the safe environmental application. During a sabbatical year in Western Australia I improved a whole system model for wheat response to water, mineral and organic nitrogen under different soils and climate conditions (Publication 1-22). Since the previous promotion I explored experimentally and by modeling the fate of carbon and nitrogen from organic wastes and composts in soil in several national and international funded projects. In a laboratory study combined with simulation (NCSOIL) we have shown that N immobilization and release to soil from compost and plant residues is dependent of C/N ratio in the labile pool of the waste rather than the C/N ratio of the whole organic residue (Publications 1-26, 1-44 and 1-51). A study of organic matter decomposition in different soils employing measurements of 13C/12C shed light and innovative understanding of interactions of organic matter decomposition with soil carbonates (Publications 1-45, 48, 49). In this study it was shown that considerable fraction (20-40%) of the CO2 emission from calcareous soils following organic waste application was released from carbonates dissolution due to acidification by nitrification of ammonium (Publications 1-45 and 49). It was also shown that the carbonates in the soil profile of the east side of Bet Sha'an valley have been formed from precipitation of organic carbon from plant residues (Publication 1-48). The emission of greenhouse gases (GHG) from agricultural activities, including organic wastes and fertilizers application to soil is an important environmental issue, however there is lack of information on GHG emission in Mediterranean regions. Our laboratory and field studies provide new quantitative information on GHG emission from different organic wastes applied to different soils and insight into the main environmental and management factors controlling the GHG emission under Mediterranean climate (Publication 1-43, Hecht M.Sc, thesis, Ben Naim M.SC. Thesis).

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

**Fertigation in soil and soilless culture and crop quality**

Vegetables and flowers grown under protected conditions are major crops in Israel agriculture. Fertigation is one of the main management tools available for the grower to achieve high quality yields of these crops. It was shown in my early research that sufficient nitrogen and phosphorus fertilization of pepper seedlings in the nursery is crucial for further transplants establishment in field and fruit yields (publications 1-6,-7 and 11). Protocols for minimizing the incidence of blossom-end rot and other fruit disorders in pepper and tomato fruits by means of proper fertigation (NO3/NH4 ratio, K/Ca, Mn, Ca and Mg concentrations) have been developed by us in cooperation with the extension service and regional research and development stations (Lachish, Besor, Arava and Ramat Hanegev) and were adapted quickly by growers in Israel (Publications 1-16,19,20,26,29,40, 3-8, 6-9,14).

Rose was the leading cut flower in the flower production industry of Israel. One of the common quality problems of the rose flower is infection by gray mold. We developed fertigation and irrigation management that reduced the post-harvest susceptibility to gray mold infection, improved flower quality and reduced the use of pesticide (Publications 1-21 and 24). Although the rose industry in Israel declined the same principles of Ca nutrition have been followed in developing environmental management to minimize gray mold in Basil.

In the era of desalinated water supply to agriculture there is a need to adjust fertilization to this new source of high quality water with low nutrients content. Early field observations and analysis of literature data have been used by us to estimate the required additional elements to the desalinated water to meet crops requirements (Publications 1-33 and 5-22). This unique study has been used as a background for a national committee in establishing guidelines for desalinated water standards. The required adjustment of N, Ca and Mg fertilization of pepper and tomato to water quality was quantified in greenhouse experiments (Publication 5-18 and Seligman Ph.D. thesis) and the outcome have already been assimilated in fertilization recommendation of the extension service in Israel.

**Irrigation with wastewater – nutrients supply and salts accumulation and leaching**

Irrigation with TWW may pose a threat to the quality of underground water from uncontrolled leaching of nutrients and salts. We have shown in several studies that TWW are an effective source of nutrients to different crops (Publications 1-28,47,50, 3-6,8, 5-15, 6-10). These results contributed to the reduction in nitrogen fertilization in orchards irrigated with TWW (The 2005 report of the effluent survey). As most of the citrus orchards are irrigated with TWW and they occupy over 20,000 ha, the impact is very significant. In another study we found that persimmon is relatively tolerant to Boron concentration in the range found in TWW, therefore it can be irrigated with secondary TWW (Publications 1-36 and 5-24). We found that irrigation with TWW with relative low EC and SAR values caused much smaller decline in the physical properties of heavy soil than saline water (Publications 1-34,35,38 and 5-23). This information served the Beit Sha'an region in determining the policy how to use 4 milions m3 TWW, about quarter of the region water resources. Although our findings indicated that irrigation with TWW can be sustainable in light texture soil, some negative effects have been found in long term irrigation of orchards in heavy soils (Publication 1-47). In the last three years I'm leading a multidisciplinary research on the effects of TWW irrigation of grapefruit orchard planted in heavy soil. Early findings indicate that the results will be helpful in understanding the main factors and processes leading to soil declining and the damage to the trees and the methods for soil and trees remediation.

**Organic wastes Application to soil - soil fertility, plant nutrition and GHG emission**

The application of organic wastes to agricultural field is one of the major potential means to recycle organic wastes like sewage sludge and farm manure in sustainable way (Publication 5-21). Using laboratory methods to quantify the organic wastes properties and simulations with a model we can predict the release of mineral nitrogen with time from organic wastes and plant residues (Publications 1-26, 1-44 and 1-51). Thus our findings from laboratory, lyzimeter study and field studies (Publications 1-44, 1-49, 1-25, 1-26, 5-21) can be used as guidelines for application of organic wastes to agriculture in Israel. In a study conducted in cooperation with researchers from Egerton University from Kenya (AID-CDR funding) we showed that a rotation of chickpea-wheat doubled the income due to the additional chickpea grains yield (Publications 1-42 and 2-2). The incorporation of the chickpea residues reduced the need for mineral N fertilization as a result of mineral N release (Publications 1-42 and 51). These findings have been distributed to growers in Kenya and they have high impact for large cultivated area.

In the last decade my research in the field of organic waste was directed to a new direction, the emission of GHG from the field (Publication 1-43 and Hecht M.Sc. thesis). As there is a lack of information on GHG fluxes from fields under Mediterranean climate and there have been no measurements in Israel, the ongoing research will provide the basic required information for all stakeholders in Israel in the agricultural and environmental aspects.