VARDA KAGAN-ZUR
CURRICULUM VITAE

Decemcer 2013

PERSONAL DETAILS

Date and Place of Birth:	April 27, 1939, Jerusalem, Israel
Citizenship:	Israeli
1957-59:	Army Service
1957-67:	Kibbutz member (Revivim, then Menara)
Address (work):	Life Sdiences Department, Ben-Gurion University of the Negev, P.O. Box 623, Beer-Sheva 84105, Israel
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EDUCATION

1967-70:	B.Sc. Biology, Ben-Gurion University of the Negev, Beer-Sheva, Israel. Ben-Gurion University Awards Graduated with distinction.
1971-72:	M.Sc. Physiology, Ben-Gurion University of the Negev Delek Co. Award 1971 Thesis: Studies on the compartmentation of the Calvin cycle and pentose shunt enzymes in the plant cell. Advisor: Prof. Herman Lips Graduated with distinction
1973:	A three-month EMBO Fellowship for travel to Prof. D.A. Walker's laboratory at Sheffield University, England
1974:	Brandeis University Fellowship for a year's research with Prof. M. Gibbs
1975-79:	Ph.D. in plant physiology. Thesis: A study of problems concerning compartmentation of Calvin-cycle enzymes

Supervisor: Prof. S.H. Lips, Department of Biology, Ben-Gurion University. Thesis approved Jan. 1980.

1980-81: Postdoctoral research period: molecular genetics at the Molecular Biology Department, Edinburgh University with Prof. Donachie, W.D., working on genetics of *E. coli* cell cycle. Awarded British Council Scholarship 1980.

EMPLOYMENT HISTORY

2007-Present Retired
2004-2007 Faculty member, Life Sciences Department, Ben-Gurion University of the Negev, Beer-Sheva.

1984-2004: Researcher - The Institute for Applied Research, Ben-Gurion University of the Negev, Beer-Sheva.

2004 Associate Professor

2002 Research Grade A+

1995-1996 Sabbatical year at the INRA de Nancy, France, with Dr. F. Martin

1995 Research Grade A

1990-1991: Sabbatical year at Purdue University, West Lafayette, Indiana, with Prof. A.K. Handa

1989: Research Grade B

1984 Research Grade C

1983: Lecturer at the Ben-Gurion University Medical School. Research: Bacteriophage Mu integration problems.
Lecturer

1982: Postdoctoral position at the Ben-Gurion University, Department of Biology

1980-81: Post doctoral position at Edinburgh University, researching E. coli cell-cycle genes. Teaching a course on bacteriophage Mu

1975-79: Teaching assistant, then instructor, teaching cell biology, biochemistry, plant physiology (Head Instructor, 1978), general genetics (Head Instructor 1979)

PROFESSIONAL ACTIVITIES

2003-2004	Member , supreme committee for researcher grade promotions.
2001-2003	Head, Institute for Agriculture and Applied Biology, The Institutes for Applied Research
2001- Present	Member, Committee for Marketing Oriented Research, Ministry of Agriculture
1999-2000	Periodical Acting Director of the Institute for Agriculture and Applied Biology
2000	Member of the organizing committee Faculty day, Health Sciences, BGU, in charge of poster session organization.
1992-1995	Liaison officer to MASHAV (Israeli Foreign Office), responsible for foreign trainees
1992	Member of the 'New Crops' grant proposals judgement committee, Agricultural Research Authority, Ministry of Agriculture

Community volunteer work

1985-1990	Official guardian to an orphan whose remaining family could not take care of his financial and educational affairs
2000-2010	In the framework of Bashaar activities – lectures to high-school students on topics of molecular genetics.

Memberships in Scientific Associations

Israel Botanical Society
International Society of Plant Molecular Biology
American Phytopathological Society
Mycorrhizologists
TAUESG

EDUCATIONAL ACTIVITIES

(a) Courses taught

1981	Bacteriophage Mu, at the Department of Molecular Biology, Edinbourgh University
1982-1983	1. General genetics and biochemistry (Recanati Nursing School) 2. Bioenergetics: Ben-Gurion University Medical School

1985-2007:	Mobile DNA: Department of Life Sciences, BGU
1995	Function of Mycorrhizas in Soil, an invited graduate and post graduate course, lecturing along with Prof. N. Roth-Bejerano; at the University of Torino, Faculty of Agronomy.
1996	Molecular Biology of the Cell: Department of Life Sciences BGU
2000-2002	General Genetics, a service course to the Biotechnology Dept. with Dr. S. Sivan
2002- 2007	The roots and their environment – with Dr. M. Zilberbush
2004- 2007	From Gene to Protein, Service course to Non-Biologists

(b) Research Students

1987 Sara Sivan, M.Sc. (with Prof. A. Zaritsky)

1988 Dafna Yaron-Miron, M.Sc. (with Prof. Y. Mizrahi)

1989 Ayala Meir, M.Sc. (with Prof. Y. Mizrahi)

1991 Miri Lapidot, M.Sc (with Prof. Y. Mizrahi and Dr. Dudi Bar-Zvi)

1995 Smadar Lischinsky, M.Sc. (with Prof. N Roth-Bejerano)

1997 Michal Hadas, M.Sc. (with Prof. N Roth-Bejerano)

2001 Sharon Holdengraeber, M.Sc. (with Prof. N Roth-Bejerano)

2001 Gil Bohrer, M.Sc. (with Prof. N Roth-Bejerano and Dr. D. Ward)

2002 Marianna Zaretskiy M.Sc. (with Prof. N Roth-Bejerano and Dr. David Mills)

2002 Yael Hazan M.Sc. (with Prof. N Roth-Bejerano)

2002 Gilad Beck M.Sc. (with Prof. N Roth-Bejerano)

2004 Yvon Ventura, Ph.D. (with Prof. N Roth-Bejerano and Dr. David Mills)

2006 Marianna Zaretsky PhD. (with Prof. N Roth-Bejerano and Dr. David Mills)

2006 Yael Hazan-Ferdman PhD. (with Prof. N Roth-Bejerano)

2013 Tidhar Turgeman PhD. (with Dr Y. Sitrit and Prof. N Roth-Bejerano)

Project Students

1. Eran Raveh (With Prof. N. Roth-Bejerano)

2. Smadar Lischinski (With Prof. N. Roth-Bejerano)

3. Rakefet Golan (With Prof. N. Roth-Bejerano)

4. Sharon Holdengraeber (with Prof. N Roth-Bejerano)

5. Eran Eyal (with Prof. N Roth-Bejerano)

6. Alona Neymark (with Dr. A. Bouskila)

7. Ronit Rimon (with dr. S. Mendlinger)

8. Maxim Itkin (with Prof N Roth Bejerano & Dr. D. Mills)

9. Sher Ashtamker (With Dr. Y. Ziv)

10. Yamit Tal (With Dr. Y. Ziv)

11. Inbal Cohen (with Prof. N. Roth-Bejerano

Foreign Trainees

Douglas Thamage Botswana

Kalpana Manandhar, Nepal

Lu Chungui China

Francis Rutere Kenya

Stanley Mateke Botswana

Lahsen Khabar Morocco

Jin Yan China

Li Yonfang China

AWARDS

(a) Honors, Citation Awards

1969-70: Ben-Gurion University Distinction Awards, each year

1971: Delek Co. Award

(b) Fellowships

1973: EMBO Fellowship (for a three months training at Shefield University in isolation of intact chloroplasts)

1974: Brandeis University Fellowship for a year's research with Prof. M. Gibbs

1980: British Council Fellowship (for a year post doctoral study at Edinburgh University,

SCIENTIFIC PUBLICATIONS

(c) Non refereed publications

Books:

Desert Truffles. Phylogeny, Physiology, Distribution and Domestication Series: 2014. Soil Biology, Vol. 38. Kagan-Zur, V.; Roth-Bejerano, N.; Sitrit, Y.; Morte, A. (Eds.) Springer-Verlag, Germany, ISBN 978-3-642-40096-4. 397 p http://dx.doi.org/10.1007/978-3-642-40096-4

Chapters in Collective Volumes

1. Kagan-Zur, V. and Lips, S.H. Studies on the intercellular location of enzymes of the photosynthetic carbon reduction cycle. In: Proc. 3rd Int. Conf. Photosyn. M. Avron Ed. Elsevier Scientific Pub. Co., Amsterdam, 1974.

2. Donachie, W.D., Sullivan, N.F., Kenan, D.J., Derbyshire, V., Begg, K.J.and Kagan-Zur, V. 1983. Genes and cell division in *E. coli*. In Progress in Cell Cycle Controls. J. Chaloupka et al., eds. Czechoslovak Academy of Science, Prague 1983, p. 28-33.

3. Kagan-Zur, V. and Lips, S.H. 1987. A particulate cytoplasmic fraction enhancing photo-synthesis of isolated chloroplasts by activation of RuBiPCase. In: Progress in Photosynthesis Research. J. Biggins, ed. Vol. III, pp. 289-292,.

4. Roth-Bejerano, N. Wenkart, S. Mills, D. and Kagan-Zur, V. (2001) Mycorrhizal associations between *Tuber melanosporum* mycelia and *Cistus incanus* cultured roots. Corvoisier, Olivier

& Chevalier eds. Proceedings of the Vth International Congress, Science and Cultivation of Truffle. Mars 4-6, 1999. pp 173-176

5. Sharon Holdengraeber, Francis Martin, Nurit Roth-Bejerano and Varda Kagan-Zur. (2001) Some lobed fruit bodies of *terfezia boudieri* (a desert truffle) combine two ITS – RFLP patterns, suggesting independent origins. Fédération française des trufficulteurs eds. Proceedings of the Vth International Congress, Science and Cultivation of Truffle. Mars 4-6, 1999. 78-81

6. Kagan-Zur, V. Taylor, F. W. and Roth-Bejerano, N. (2001) Identification of plant hosts of the Kalahari desert-truffle *Terfezia pfeilii* Fédération française des trufficulteurs eds. Proceedings of the Vth International Congress, Science and Cultivation of Truffle. Mars 4-6, 1999. 82-86.

7. Shabi, E. Freeman, S. Maimon, M. Luzzati, Y. Kagan-Zur V., Roth-Bejerano, N. and Pinkas Y. (deceased). (2001) Introduction of *Tuber melanosporum* – into Israel. Fédération française des trufficulteurs eds. Proceedings of the Vth International Congress, Science and Cultivation of Truffle. Mars 4-6, 1999. 107-111.

8. Kagan-Zur V. 2001. Terfezias, a family of mycorrhizal edible mushrooms for arid zones. In: A. Schliesel & D Pasternak eds. Proceeding of the IPALAC Conference on 'Combating Desertification with Plants' November 1-5, 1999, Beer-Sheva Israel. Kluwer Academic Publ. New York. pp 45-53

9. Kagan-Zur V, Roth-Bejerano N, Wenkart S, Bustan A, Ventura Y, Zaretsky M, Mills D, Shabi E, Luzzati Y, Freeman S, & Pinkas Y. (2002) *Tuber melanosporum* research in Israel. In: I Hall, W Yun, E Danell & A Zambonelli eds. Edible Mycorrhizal Mushrooms and Their Cultivation. A Compact Disc Edition. ISBN 0-478-10828-X

10. Kagan-Zur, V., Roth-Bejerano, N., Sitrit, Y., Ferdman, Y. 2010. Cryptic species in the *Terfezia boudieri* complex. Österreichische Zeitschrift für Pilzkunde 19:217-219

11. Kagan-Zur V, Turgeman T, Sitrit Y, Danai O, Luzzati Y, Bustan A, Roth-Bejerano N, and Masaphy S. 2012. Itroduced Tuber aestivum spreading spontaneously in Israel. Acta Mycologica 47(2): 175-177

Invited Papers

1. Giovannetti G, N. Roth-Bejerano, E. Zanini & V. Kagan-Zur (1994). Truffles and their cultivation. Hort. Rev. 17:71-107

2. Bohrer G. Beck G. Ward D. Roth-Bejerano N & Kagan-Zur V. (2007) AM – host – environment interactions in a wild host tree, *Vangueria infausta*, from the Kalahari Desert. **In**: Montaño NM, Camargo-Ricalde SL, García-Sánchez R, A. Monroy-Ata Eds. Arbuscular Mycorrhizae In Arid And Semiarid Ecosystems**.** Mundi-Prensa SA of CV, Instituto Nacional de Ecología-SEMARNAT, UAM-Iztapalapa, FES-Zaragoza-UNAM Publishers. Distrito Federal, México. Chapter 10. Pp 305-334

3. Kagan-Zur V. & Roth-Bejerano N. (2008) Truffle research in Israel. **In**: G. Chevalier Ed. La Culture de la Truffe dans le Monde. Actes du Colloque, Brive-la-Gaillarde 2 Fevrier 2007. Imprimerie Georges Lachaise, Brive-la-Gaillarde Publ. pp 111-123.

4. Kagan-Zur V, Zaretsky M, Sitrit Y and Roth-Bejerano N. (2008) Hypogeous Pezizaceae: Physiology and Molecular Genetics. In: Varma A ed. Mycorrhiza: Structure, Function, Molecular Biology and Biotechnology, Third Edition, Springer-Verlag, Germany. Pp 161-189. ISBN 978-3-540-78824-9

5. Kagan-Zur V & Roth-Bejerano N. (2008) Desert Truffles. Fungi 1(3):32-37

6. Kagan-Zur V & Roth-Bejerano N. (2009) Studying the brown desert truffles of Israel. Isr. J. Plant Sci. 56:309-314.

7. Sitrit Y, Roth-Bejerano N, Kagan-Zur V, Turgeman T. (2014). Pre-symbiotic Interactions Between the Desert Truffle *Terfezia boudieri* and Its Host Plant *Helianthemum sessiliflorum*. In **Desert Truffles**. Phylogeny, Physiology, Distribution and Domestication. Series: 2014. Soil Biology, Vol. 38. Kagan-Zur, V.; Roth-Bejerano, N.; Sitrit, Y.; Morte, A. (Eds.) Springer-Verlag, Germany, ISBN 978-3-642-40096-4 pp 81-92

8. Kagan-Zur V, Turgeman T, Roth-Bejerano N, Morte A, Sitrit Y. 2014 Benefits Conferred on Plants. In In **Desert Truffles**. Phylogeny, Physiology, Distribution and Domestication. Series: 2014. Soil Biology, Vol. 38. Kagan-Zur, V.; Roth-Bejerano, N.; Sitrit, Y.; Morte, A. (Eds.) Springer-Verlag, Germany, ISBN 978-3-642-40096-4 pp 93-104

9. Kagan-Zur V, Akyuz M. 2014. Asian Mediterranean Desert Truffles . In: In **Desert Truffles**. Phylogeny, Physiology, Distribution and Domestication. Series: 2014. Soil Biology, Vol. 38. Kagan-Zur, V.; Roth-Bejerano, N.; Sitrit, Y.; Morte, A. (Eds.) Springer-Verlag, Germany, ISBN 978-3-642-40096-4 pp 159-171

10. Trappe JM, Claridge AW, Kagan-Zur V (2014). Ecology and Distribution of Desert Truffles in the Kalahari of Southern Africa. In…….pp 193-202

(d) Refereed Articles

1. Kagan-Zur, V. and Lips, S.H. 1975. Studies on the intracellular location of enzymes of the photosynthetic carbon reduction cycle. Eur. J. Biochem. 59:17-23.

2. Kagan-Zur, V., Friedlander, M. and Lips, S.H. 1980. Changes in chloroplasts envelopes induced by light or dark pretreatment of pea seedlings. Planta 149: 427-432.

3. Kagan-Zur, V. and Lips, S.H. 1983. A particulate cytoplasmic fraction enhancing photo-synthesis of isolated chlroplasts. I. Kinetic aspects and some characteristics of the phenomenon. Isr. J. Bot.32:203-212.

4. Kagan-Zur, V. and Mizrahi, Y. 1987. Fruit ripening in tetraploid tomato (*Lycopersicon esculentum* Mill.) J. Hort. Sci. 62(2): 243-248.

5. Mizrahi, Y., Taleisnik, E., Zohar, Y., Offenbach, R., Matan, A., Golan, R. and Kagan-Zur, V. 1988. Beneficial effects of salinity: I. Improved quality of tomato fruit with no concomitant loss of yield. J. Am. Soc. Hort. Sci. 113:202-205.

6. Sivan, S., Zaritsky, A. and Kagan-Zur, V. 1988. Replication forks of *Escherichia coli* are not the preferred sites for lysogenic integration of bacteriophage Mu. J. Bact. 170: 3089-3093.

7. Dewar, S., Kagan-Zur, V., Begg, K.J. and Donachie, W.D. 1989. Transcriptional regulation of cell division genes in *Escherichia coli.* Mol. Microbiol. 3:1371-1377.

8. Roth-Bejerano, N., Livne, D.and Kagan-Zur, V. 1990. *Helianthemum-Terfezia* relations in different growth media. New Phytol. 114:235-238.

9. Kagan-Zur, V., Mills, D. and Mizrahi, Y. 1990. Callus formation from tomato endosperm. Acta Horticulturae. 280:139-142,.

10. Kagan-Zur, V., Zamir, D., Navot, N. and Mizrahi, Y. 1991. A tomato triploid hybrid whose double genome parent is the male. J. Amer. Soc. Hortic. Sci. 116:342-345,.

11. Kagan-Zur, V., Yaron-Miron, D. and Mizrahi, Y. 1991. A study of triploid tomato fruit attributes. J. Amer. Hortic. Sci 116:228-231.

12. Kagan-Zur, V., Livne D. and Mizrahi, Y. 1992. Analysis of effects of auxin on fruit size of tetraploid and diploid tomato fruits. J. Hort. Sci. 67: 817-825.

13. Kagan-Zur, V. and Mizrahi, Y. 1993. Long shelf-life cocktail tomatoes can be picked in bunches. Sci. Hortic. 56:31-41.

14. Kagan-Zur, V., E. Raveh, S. Lischinsky & N. Roth-Bejerano. 1994. *Helianthemum - Terfezia* association is enhanced by low iron in the growth medium. New Phytol. 127:567-570

15. Lapidot, M., Bar-Zvi, D., Kagan-Zur, V. and Mizrahi, Y. 1995. Identification of the double-chromosone donor parent of spontaneous tomato triploids. Theor. Appl. Genet. 88:914-916

16 Taylor, F.W., Thamage, D.M., Baker, N., Roth-Bejerano, N. and Kagan-Zur, V. 1995. Notes on the Kalahari Desert Truffle *Terfezia pfeilii*. Mycol. Res. 99:874-878

17 Roth-Bejerano, N. and Kagan-Zur, V. 1995. Sclerotia-like agregates in culture of *Terfezia leonis*. Mycol. Veget. Mediter.9:147-152

18. Kagan-Zur, V., Tieman, D.M., Marlow, J.S. and Handa, A.K. 1995. Differential regulation of polygalacturonase and pectin methylesterase gene expression during and after heat stress in ripening tomato (*Lycopersicon esculentum* Mill.) fruits. Plant Mol. Biol. 29:1101-1110

19. Kagan-Zur, V., Kuang, J. Tabak, S. Taylor, F.W. and Roth-Bejerano, N. 1999. Potential verification of a host plant for the desert truffle *Terfezia pfeilii* by molecular methods. Myc. Res. 103:1270-1274

20. Kagan Zur V., Freeman S., Luzzati Y., Roth-Bejerano N. and Shabi E. (2000) Emergence of the first black Périgord truffle (*Tuber melanosporum*) in Israel. Mycol. Veget. Mediter. 15:187-192

21 Kagan-Zur, V, Freeman S, Luzzati Y, Roth-Bejerano, N and Shabi E. (2001) Survival of introduced *Tuber melanosporum* mycorrhizas at two sites in Israel as measured by its occurrence on mycorrhizas. Plant & Soil 229(2):159-166.

22. Wenkart S., Roth-Bejerano N., Mills D. and Kagan-Zur V. (2001). Mycorrhizal associations between *Tuber melanosporum* mycelia and transformed roots of *Cistus incanus.* Plant Cell Reports. 20(4):369-373. (DOI: 10.1007/s002990100325)

23. Bohrer, G., Kagan-Zur, V., Roth-Bejerano, N. and Ward, D. (2001). Effects of environmental variables on VAM associations abundance in wild Kalahari-Desert-populations of *V. infausta*. The Journal of Vegetation Science 12:279-288.

24. Volis S., Yakubov B., Shulgina I., Kagan-Zur V. Ward D. and Mendlinger S. (2001) Test of adaptive RAPD variation in population genetic structure of wild barley (*Hordeum spontaneum* Koch) Journal of the Linnean Society (Doi 10.1006/bijl.2001.0569) 74:289-303.

25. Mills D, S Wenkart, Roth-Bejerano N, and Kagan-Zur V. 2002. A simple procedure for the micropropagation of *Cistus incanus* from aseptic seedlings and ex vitro plants. Agr Med 132: 77-82

26. Bohrer, G., Kagan-Zur, V., Roth-Bejerano, N., Ward, D. Beck, G. & Bonifacio, E. 2003. Effects of different AM mycorrhizal communities on mineral acquisition and depletion from the soil by host plants. J. Arid Environ. 55:193 –208

27. Roth-Bejerano N, E Sela, and V Kagan-Zur. 2003. Low soil temperature favors survival of *cistus incanus-tuber melanosporum* mycorrhizas. Mycol. Veget. Mediter. 18: 84-88.

28. Roth-Bejerano N, Li Y-F & Kagan-Zur V. 2004. Homokaryotic and heterokaryotic hyphae in *Terfezia*. Antonie van Leeuwenhoek. 85: 165–168

29. Aviram S, N Roth-Bejerano & V. Kagan-Zur. 2004. Two *ITS* forms co-inhabiting a single genet of an isolate of *Terfezia boudieri* (Ascomycotina), a desert truffle. Antonie van Leeuwenhoek 85**:** 169–174.

30. Roth-Bejerano N, Mendlinger S, & Kagan-Zur V. 2004 Effect of calcium on growth of submerged *Terfezia boudieri* mycelium. Mycoscience 45:30–34

31. Ferdman Y, Aviram S, Roth-Bejerano N, Trappe JM, & Kagan-Zur V. 2005 Phylogenetic Studies of *Terfezia pfeilii* and *Choiromyces echinulatus* (Pezizales) support new genera for southern African truffles: *Kalaharituber* and *Eremiomyces***.** Mycological Research, 109 (2): 236-244

32. Zaretsky M, Kagan-Zur V, Mills D & Roth-Bejerano N. 2006 Analysis of mycorrhizal associations formed by *Cistus incanus* transformed root clones with *Terfezia boudieri* isolates. Plant Cell Reports 25:62-70, (DOI 10.1007/s00299-005-0035-z)

33. Ventura Y, Mills D, Kagan-Zur V, Roth-Bejerano N & Bustan A. 2006. Mycorrhized Ri-transformed roots facilitate in vitro inoculation of Cistus incanus with Tuber melanosporum Plant Cell, Tissue and Organ Culture 85: 53–61 (DOI 10.1007/s11240-005-9048-0)

34. Zaretsky M, Sitrit Y, Mills D, Roth-Bejerano N & Kagan-Zur V. 2006. Differential expression of fungal genes at pre-infection and mycorrhiza establishment between Terfezia boudieri isolates and Cistus incanus hairy root clones. New Phytol. **171**:837–846 (doi: 10.1111/j.1469-8137.2006.01791.x)

35. Bustan A, Ventura Y, Kagan-Zur V & Roth-Bejerano N. 2006. Optimized conditions for mycorrhiza formation between the pink rockrose (*Cistus incanus*) and the black Perigord truffle (*Tuber melanosporum*). Israel Journal Of Plant Sciences 54 (2):87-96.

36. Kagan-Zur V & Roth-Bejerano N. 2008. Unresolved problems in the life cycle of truffles. The Open Mycology Journal. 2:86-88

37. Ferdman Y, Sitrit Y, Li Y-F, Roth-Bejerano N & Kagan-Zur V. 2009. Cryptic species in the *Terfezia boudieri* complex. Antonie van Leeuwenhoek International Journal of General and Molecular Microbiology. 95(4):351-362. DOI: 10.1007/s10482-009-9321-z.

38. Turgeman T, Ben-Asher Y, Roth-Bejerano N, Kagan-Zur V. Kapulnik Y and Sitrit Y. 2011. Mycorrhizal association between the desert truffle *Terfezia boudieri* and *Helianthemum sessiliflorum* alters plant ohysiology and fitness to arid conditions. Mycorrhiza (DOI 10.1007/s00572-011-0369-z) 21:623-630.

39. Turgeman T, Sitrit Y, Danai O, Luzzati Y, Bustan A, Roth-Bejerano N, Kagan-Zur V and Masaphy S. 2012 Introduced *Tuber aestivum* replacing introduced *Tuber melanosporum*: a case study. Agroforestry Systems. **84(3):337-343** DOI: 10.1007/s10457-011-9478-0

(f) Reports

All the following reports may be found at The Institutes for Applied Research, Ben-Gurion University of the Negev, Beer-Sheva, Israel.

Tomato cultivation

1. Mizrahi, Y., Arad (Malis), S., Kagan-Zur, V., Kedar, N. and Kopeliovitch, E. Development of long-shelf-life tomato varieties suitable for the American market; annual report for March 1983-Feb. 1984. Report No. BGUN-ARI-21-84, Feb. 1984.

2. Mizrahi, Y. and Kagan-Zur, V. Development of long-shelf-life tomato varieties suitable for the American market; semi-annual report March-August 1984. Report No. BGUN-ARI-67-84, Aug. 1984.

3. Kagan-Zur, V. and Mizrahi, Y. Use of genes that inhibit ripening to prolong the shelf life of tomatoes for export; final report for the period April 1983-March 1984. Report No. BGUN-ARI-64-84, Aug. 1984. (In Hebrew).

4. Mizrahi, Y. and Kagan-Zur, V. Production of seeds of triploid strains of tomatoes; interim report April-September 1984. Report No. BGUN-ARI-90-84, Nov. 1984. (In Hebrew).

5. Kagan-Zur, V. and Mizrahi, Y. Production of triploid seeds of tomato varieties; semi-annual report, Apr.-Sept. 1984. Report No. BGUN-ARI-10-85.

6. Mizrahi, Y., Kagan-Zur, V., Kedar, N. and Kopeliovitch, E. Development of long-shelf-life tomato varieties suitable for the American market; second annual report for March 1984-Feb. 1985. Report No. BGUN-ARI-17-85.

7. Kagan-Zur, V., and Mizrahi, Y. Production of triploid seeds of tomato varieties; annual report April 1984-March 1985. Report No. BGUN-ARI-36-85. (In Hebrew).

8. Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of high quality long-shelf-life tomato hybrids by the use of various dosages of *rin* and *nor* nonripening genes. Progress report to the Israel Endowment Fund. Report No. BGUN-ARI-70-85.

9. Kagan-Zur, V., and Mizrahi, Y. Fruit ripening in tetraploid tomato *Lycopersicon esculentum* Mill; progress report for Oct. 1985-Jan.1986. Submitted to the Israel Endowment Fund. Report No. BGUN-ARI-3-86.

10. Mizrahi, Y. and V. Kagan-Zur. Development of long-shelf-life tomato varieties suitable for the American market; semiannual report. Report No. BGUN-ARI-17-86.

11. Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of high quality long-shelf-life tomato hybrids by the use of various dosages of *rin* and *nor* nonripening genes; progress report, submitted to the Israel Endowment Fund. Report No. BGUN-ARI-39-86.

12. Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes; annual report, submitted to the Israel Endowment Fund. Report No. BGUN-ARI-62-86.

13. Kagan-Zur, V. and Mizrahi, Y.: A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes; progress report July-December 1986. Submitted to the Israel Endowment Fund. Report No. BGUN-ARI-8-87.

14. Kagan-Zur, V. and Mizrahi, Y. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes; annual report, submitted to the Israel Endowment Fund. Report No. BGUN-ARI-40-87.

15. Kagan-Zur, V. and Mizrahi, Y. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of *rin* and *nor* nonripening genes; interim report, July-December 1987. Report No. BGUN-ARI-9-88.

16. Kagan-Zur, V. and Mizrahi, Y. Possible improvement of tomato flavor by saline water irrigation. Final report for Nov. 1985-Oct. 1986. Report No. BGUN-ARI-16-88. (In Hebrew).

17. Mills, D., Kagan-Zur, V, Abramovich, R., Wenkart, S. and Mizrahi, Y. Production of triploid tomato plant; semi-annual report August 1987-January 1988. Report No. BGUN-ARI-23-88.

18. Kagan-Zur, V. and Mizrahi, Y. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes; annual report, April 1987-March 1988. Report No. BGUN-ARI-32-88. (In Hebrew).

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Others

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31. Mendlinger, S.; Chweya, J.; Benzioni, A.; Nahashon, S.; Ventura, M.; Kagan-Zur, V. Southern African edible vegetables: germplasm collection, evaluation and breeding; progress report January-June 1990. Report No. BGUN-ARI-52-90; Dec. 1990.

Truffle cultivation

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33. Kagan-Zur, V., Bejerano, N. and De Malach, Y. Local truffle cultivation on marginal lands. Report No. BGUN-ARI-73-86. (in Hebrew).

34. Kagan-Zur, V., Bejerano, N. and De Malach, Y. Local truffle cultivation on marginal lands. Report No. BGUN-ARI-16-87. (in Hebrew).

35. Kagan-Zur, V., Bejerano, N. and De Malach, Y. Local truffle cultivation on marginal lands. Report No. BGUN-ARI-24-87. (in Hebrew).

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53. Kagan-Zur, V. and N. Roth Bejerano. Cultivation of truffles. Annual Report July 1993-June 1994. Report No. BGUN-ARI-48-94.

54. Roth Bejerano, N. and V. Kagan-Zur. Introduction of *Tuber melanosporum* the black Perigord truffle as a potential crop for calcareus lands in Israel. (In Hebrew). Submitted to the Jewish Agency, Report No. BGUN-ARI-16-95; 1995.

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56. Itzhaki , H., Roth-Bejerano N. and Kagan-Zur V. Use of RAPDs to identify Terfezia in mycelial cultures and mycorrhizal associations. BGUN-ARI-45-95; 1995. (In Hebrew)

57. Kagan-Zur, V., N. Roth Bejerano. Cultivation of annual truffles. BGUN-ARI-47-95; 1995

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66. Kagan-Zur, V., Roth-Bejerano, N., Ilan, A., and Hayat, E. Developing a method for T. melanosporum mycorrhized microporopagated oak seedlings. Interim report, to the Keren Kayemet LeIsrael. March 2001

67 Kagan-Zur, V., Roth-Bejerano, N., Ilan, A., and Hayat, E. Developing a method for T. melanosporum mycorrhized microporopagated oak seedlings Annual report, to the Keren Kayemet LeIsrael. July 2001

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69. Kagan-Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum* into Israel. Report to the Chief Scientist, Ministry of Agriculture, January, 2002. In Hebrew

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71. Kagan-Zur, V., Roth-Bejerano, N. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. First management report, **BGUN-ARI-36-2002** Submitted to the AID-CDR

72. Kagan-Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum* into Israel. **BGUN-ARI-10-2003** Submitted to the Chief Scientist, Ministry of Agriculture, March 2003. In Hebrew

73. Kagan-Zur, V., Roth-Bejerano, N. Cole D. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. First year report, **BGUN-ARI-23-2003** Submitted to the AID-CDR

74. Kagan-Zur, V., Roth-Bejerano, N. Cole D. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. Second year report semiannual report, **BGUN-ARI-43-2003** Submitted to the AID-CDR

75. Kagan-Zur, V., Roth-Bejerano, N. Cole D. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. Second year report semiannual report, **BGUN-ARI-20-2004** Submitted to the AID-CDR

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ABSTRACTS PRESENTED AT MEETINGS

(a) Plenary lectures

1998. Kagan-Zur , V. Terfezias, a family of mycorrhizal edible mushrooms for arid zones. An invited talk, presented at the Pre ICOM, & ICOM: Second International Conference on Mycorrhiza. July 5-10 1998, Uppsala, Sweden.

(b) Presentation of papers at conferences/meetings

1. Kagan-Zur, V. and Lips, S.H. Location of Calvin photosynthetic cycle. Isr. J. Bot. 22:203, 1973.

2. Hatfull GF, Begg KJ, Sullivan NF, Kagan-Zur V, Derbyshire V, Donachie WD (1982) Genetic organization of the sep-enva gene-cluster in *Escherichia-coli*. Abstract in: Heredity 48:321-321

3. Kagan-Zur, V. and Lips, S.H. A particulate cytoplasmic fraction enhancing photosynthesis of isolated chloroplasts by activation of RUBPCase. VII International Congress on Photosyntheis. August 10-15, 1986, Brown University, Providence, Rhode Island, U.S.A.

4. Kagan-Zur, V. and Mizrahi, Y. Fruit production by triploid tomato plants. Tomato Biotechnology Symposium, Davis, Aug. 20-22 1986 .

5. Sivan, S., Zaritsky, A. and Kagan-Zur, V. Does lsogenic integration of bacteriophage mu occur preferentially at replication forks of the *Escherichia coli* chromosome? EMBO Workshop on Molecular Basis of Bacterial Growth and Division. September 27-October 1, 1987, Segovia, Spain. Oral presentation

6. Sivan, S., Zaritsky, A. and Kagan-Zur, V. Replication forks of Escherichia coli are not the preferred site for bacteriophage mu lysogenic integration. Abstract in Nucl. Acids Res. 15:1876 1988

7. Kagan-Zur, V., Livne, D. and Roth-Bejerano, N. *Helianthemum* - *Terfezia* interaction in early developmental stages. The Bat-Sheva Seminar on Host - Fungus Interaction. March 14-25, 1988. Jerusalem, Israel. Abstract in Phytoparasitica 16:187 1988

8. Kagan-Zur, V., Mills, D. and Mizrahi, Y. Callus formation from tomato endosperm. International Society for Horticultural Science Meeting "*In vitro* culture and horticultural breeding." Cesena, Italy May 1989.

9. Kagan-Zur, V., Mills, D. and Mizrahi, Y. Callus formation from tomato endosperm. Abstract in: In Vitro 25:3 p. 60 A., June 11-14, 1989, Orlando, Florida, U.S.A.

10. Kagan-Zur, V., Raveh, E., Livne, D. and Roth-Bejerano, N. *Helianthemum* - *Terfezia* relations in different growth media. Aug. 28-Sept. 3, 1990, Regensburg, W. Germany.

11. Roth Bejerano, N., Gersani, M., Livne, D. and Kagan-Zur, V. Influence of *Terfezia leonis* on the root system of *Helianthemum sessiliflorum* seedlings in early stages of interaction. Aug. 28-Sept. 3, 1990, Regensburg, W. Germany.

12. Kagan-Zur, V., Tieman, D.M., Mizrahi, Y. and Handa, A.K. Polygalacturonase expression is impaired by heat storage of ripening tomato fruits. International Society of Plant Molecular Biology Meeting. October 6-12, 1991, Tucson, Arizona, U.S.A.

13. Kagan-Zur, V. and A.K. Handa. Heat storage of ripening tomato fruits impairs polygalacturonase expression more acutely than that of pectin methylesterase. Tomato Molecular Biology Meeting. Aug. 16-20, 1992, Davis, California, U.S.A.

14. Lischinsky, S. V. Kagan-Zur and N. Roth-Bejerano. Variation in different isolates of *Terfezia leonis* Tul. Fifth International Mycological Congress. August 14-21, 1994, Vancoover, Canada.

15. Kagan-Zur, V., F.W. Taylor, D.M. Thamage and N. Roth-Bejerano. *Terfezia pfeilii*, a Desrt truffle from the Kalahari. Fifth International Mycological Congress. August 14-21, 1994, Vancoover, Canada.

16. Kagan-Zur, V., N. Roth-Bejeran and F.W. Taylor. Studies of Terfezia pfeilii, a Kalahari desert truffle. Second International Congress on Symbiosis. April 13-18, 1997, Woods Hole,MA, USA

17. Kagan-Zur, V. , Holdengraeber, S. & Roth-Bejerano, N. Variability and heterozygosity of the ITS region of the rRNA genes, in wild fruit bodies of two desert truffle species. Sixth International Mycological Congress. August 23-28,1998, Jerusalem Israel.

18. Roth-Bejerano, N. , Wenkart, S. , Mills, D. and Kagan-Zur, V. Mycorrhizal associations between Tuber melanosporum mycelia and Cistus incanus cultured roots. Sixth International Mycological Congress. August 23-28,1998, Jerusalem Israel

19. Holdengraeber, S., Martin, F., Roth-Bejerano, N. and Kagan-Zur, V. Some lobed fruit bodies of *terfezia boudieri* (a desert truffle) combine two ITS – RFLP patterns, suggesting independent origins. Vth International Congress, Science and Cultivation of Truffle. Aix en Provence , France, Mars 4-6, 1999.

20. Kagan-Zur, V. Taylor, F. W. and Roth-Bejerano, N. Identification of plant hosts of the Kalahari desert-truffle *Terfezia pfeilii* Vth International Congress, Science and Cultivation of Truffle. Aix en Provence , France Mars 4-6, 1999.

21. Shabi, E. Freeman, S. Maimon, M. Luzzati, Y. Kagan-Zur V., Roth-Bejerano, N. and Pinkas Y. (deceased). Introduction of *Tuber melanosporum* into Israel. Vth International Congress, Science and Cultivation of Truffle. Aix en Provence , France Mars 4-6, 1999.

22. Roth-Bejerano, N. Wenkart, S. Mills, D. and Kagan-Zur, V. Mycorrhizal associations between *Tuber melanosporum* mycelia and *Cistus incanus* cultured roots. Proceedings of the Vth International Congress, Science and Cultivation of Truffle. Aix en Provence , France Mars 4-6, 1999.

23. Kagan-Zur V. Terfezias, a family of mycorrhizal edible mushrooms for arid zones. IPALAC Conference on 'Combating Desertification with Plants Beer-Sheva Israel, November 1-5, 1999. Oral presentation.

24. Bohrer, G., Ward, D., Kagan-Zur, V., and Roth-Bejerano N. Correlations between abundance of endomycorrhizal fungal communities, environmental conditions and plant community composition in the Kalahari desert. Presented at the IAVS Symposium, Vegetation and Climate. Bilbao, Spain, 26-30 July, 1999. Oral presentation

25. Bohrer, G., Ward, D., Kagan-Zur, V., and Roth-Bejerano N. Success of the indigenous Khalahari fruit tree *Vangueria infausta* is dependant on interactions with endomycorrhizal fungi. The IPALAC (the International Program for Arid Land Crops) conference on: 'Combating Desertification With Plants'. Beer-Sheva, Israel, November 1-5, 1999.

26. Bohrer, G., Ward, D., Kagan-Zur, V., and Roth-Bejerano N. Evidence of hostpreferences in natural communities of VAM fungi from the Kalahari desert. The American Ecological Society, Snowbird, Utah, USA, August 6-10, 2000

27. Kagan-Zur V, Roth-Bejerano N, Wenkart S, Bustan A, Ventura Y, Zaritzki M, Mills D, Shabi E, Luzzati Y, Freeman S, & Pinkas Y. *Tuber melanosporum* research in Israel. Second meeting: Edible mycorrhizal mushrooms. Christchurch New-Zealand 3-6 July 2001 p3. Oral talk

28. Kagan-Zur V, Aviram S, Ferdman Y & Roth-Bejerano N. Terfezia species (desert truffles): ITS and 25S rDNA analyses. 3rd International Conference on Mycorrhizas. Adelaide, Australia, 8-13 July, 2001, P2-83.

29. Kagan-Zur V. Mycorrhizas and trees for arid lands. IPALAC meeting on Trees for Arid Lands. Beer-Sheva, 4-17 November, 2001, Oral presentation

30. Kagan Zur V. Aviram S. Ferdman Y. Li Y. & Roth-Bejerano N. Phylogenetic studies of some Terfezia and Choiromyces species – IMC7,. Oslo 11-16 Aug 2002. P. 212, Abst. No. 702

31. Ventura Y. Kagan ZurV. Bustan A. Mills D. & Roth-Bejerano N. In vitro mycorrhization of *Cistus incanus* seedlings by *Tuber melanosporum* mycelium. IMC7, Oslo 11-16 Aug. 2002. P. 316. Abst. No. 1048 – IV

32. Zaretsky M, Sitrit Y, Mills D, Roth-Bejerano N & Kagan-Zur V. Gene expression during establishment of mycorrhizal associations between Cistus hairy roots and *Terfezia boudieri* isolates. ICOM4 , August 10-15, Montreal Canada 2003. Abst. 279, p313

33. Ferdman Y, Aviram S, Roth-Bejerano N & Kagan-Zur V. Phylogenetic studies of some hypogeous Pezizaceae species. ICOM4 , August 10-15, Montreal Canada 2003. Abst. 280, p314

34. Kagan-Zur V, Bustan A, Mills D, Roth-Bejerano N, Wenkart S, Ventura Y, Zaretzky M.. Differences between hairy root clones and fungal isolates in forming mycorrhizas. ICOM4 , August 10-15, Montreal Canada 2003. Abst. 281, p315

35. Roth-Bejerano N, Kagan-Zur V, Mills D and Zaretsky M. Mycorrhiza formation by hairy root clones with *Terfezia boudieri* isolates . ICOM4 , August 10-15, Montreal Canada 2003. Abst. 282, p316

36. Mills D, Y. Ventura, V. Kagan-Zur, N. Roth-Bejerano & A. Bustan. Effects of sugars on *in vitro* growth of *Cistus incanus* hairy roots *Tuber melanosporum* mycelium . ICOM4 , August 10-15, Montreal Canada 2003. Abst. 282, p316 Oral presentaion

37. Mills D, Ventura Y, Kagan-Zur V, Roth-Bejerano N & Bustan A. Sterile Systems of mycorrhized hairy roots may be used to improve in vitro production of mycorrhized seedlings. 3rd International Workshop on Edible Mushrooms, Victoria, British Columbia, Canada, August 16-21 2003 P45 Oral presentation

38. Bustan A., Y. Ventura, N Roth-Bejerano & V. Kagan-Zur. Optimizing growing conditions towards intensive cultivation of the black Perigord truffles. Oral presentation. 3rd International Workshop on Edible Mushrooms, Victoria, British Columbia, Canada, August 16-21 2003 P14. Oral Presentation

39. Kagan-Zur V, Roth-Bejerano N, Sitrit Y and Ferdman Y. First annual meeting of the *tuber aestivum/uncinatum* european group (TAUESG), 6- 8 November 2009, Vienna Abstract p. 12. Oral presentation

40. Kagan-Zur V, Turgeman T, Sitrit Y, Danai O, Luzzati Y, Bustan A, Roth-Bejerano N, and Masaphy S. Itroduced Tuber aestivum spreading spontaneously in Israel. 4th annual meeting of the *tuber aestivum/uncinatum* european group (TAUESG). September 26-30 2012. Gödöllő Hungary. Oral presentation

41. Sitrit Y, Turgeman T, Kagan-Zur V, Roth Bejerano N, Lewinsohn E, Hadas R, Singer A, Zaady E, Kapulnik Y, Koltai H (2013) Pre-symbiotic interactions between *Terfezia boudieri* and *Helianthemum sessiliflorum* reveal a novel role for auxin: redirection of roots growth by intervention in gravitropism. 7th International conference on mycorrhiza "mycorrhiza for all: An under-earth revolution", New Delhi, India, ICOM7 abstract p 98. Oral presentation

(c) Presentations at informal seminars and workshops

1988 An Israeli-British meeting on tomato research. Faculty of Agriculture, Hebrew University

(d) Seminar presentation at universities and institutions

1991 Triploid and tetraploid tomatoes. At purdue University, West Lafayette, Indiana USA

1992 Heat Effects on polygalacturonase expression in post harvest tomatoes. Heifa University

1993 Heat Effects on polygalacturonase expression in post harvest tomatoes. The Volcani Institute

1996 Truffles as mycorrhizas. Keren Kayemet LeIsrael Seminar day.

2004 What may be learned from a mild molecular study of Desert truffles. Meigal, Upper Galilee

2004 Truffle production in Israel. Faculty of Agriculture, The Hebrew University, Rehovot

2005 New knowledge emerging from the study of Kalahari desert-truffles. Dept. Biological Sciences. University of Botswana.

2005 Kalahari Desert truffles, Botswana college of Agriculture.

RESEARCH GRANTS

1985: Kagan-Zur, V. Microorganisms in jojoba oil, Negev Jojoba. $1,275.

1985: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Ministry of Agriculture. Vegetable Marketing Board. $5,000.

1985: Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. P.E.F. Israel Endowment Fund. $40,000.

1985: Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. Agricultural Research Authority. $10,000.

1985: Kagan-Zur, V. and Y. Avissar. Broadening of host range of *Rhizobium* species. The Dr. Herman Kessel Research Fund in memory of CJJ Van Rensburg. $6,667.

1986: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Jewish Agency through Ramat Negev Regional Council. $12,000.

1986: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Ministry of Industry & Trade, Chief Scientist's Office. I.S.20,000.

1986: Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. P.E.F. Israel Endowment Fund. $25,000.

1986: Mizrahi, Y. and Kagan-Zur, V. Use of triploid tomatoes. Ministry of Industry & Trade, Chief Scientist's Office. I.S.40,000.

1987: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Jewish Agency through Ramat Negev Regional Council. I.S.27,000.

1987: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Ministry of Industry & Trade, Chief Scientist's Office. I.S.28,600.

1987: Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. Agricultural Research Authority. I.S.16,000.

1987: Mizrahi, Y. and Kagan-Zur, V. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. Southern R&D Authority. I.S.20,000.

1987: Mizrahi, Y. and V. Kagan-Zur. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. P.E.F. Israel Endowment Fund. $15,000.

1987: Mills, D., V. Kagan-Zur and Y. Mizrahi. Production of triploid tomato through tissue culture. P.E.F. Israel Endowment Funds Inc. $15,000.

1988: Mills, D., V. Kagan-Zur and Y. Mizrahi. Production of triploid tomato through Tissue Culture. Jewish Agency. $25,000.

1988: Mizrahi, Y., D. Mills and V. Kagan-Zur. Production of triploid tomato plants P.E.F. Israel Endowment Funds Inc. $50,000.

1988: Kagan-Zur, V. and Mizrahi, Y. Finger printing of triploid tomatoes. Advanced Products Prototype Fund. $4,500.

1988: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Jewish Agency through Ramat Negev Regional Council. I.S.25,000.

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1988: Mills, D. and V. Kagan-Zur and Y. Mizrahi. Production of triploid tomato through Tissue Culture. Jewish Agency. $25,000.

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1989: Kagan-Zur, V., N. Bejerano and Y. De Malach. Local truffle cultivation on marginal lands. Jewish Agency through Ramat Negev Regional Council. I.S.25,000.

1989: Cherry, J.H., A. Handa, Y. Mizrahi, and V. Kagan-Zur. Regulation of tomato ripening and storage life by heat and salt stresses. BARD $33,000.

1990: Kagan-Zur, V., N. Roth-Bejerano and F. Taylor. Cultivation of the local Botswana truffle. AID-CDR $50,000.

1990: Mizrahi, Y., D. Mills and V. Kagan-Zur. Production of triploid tomato plants. PEF/Israel Endowment Fund Inc. $30,000.

1990: Mizrahi, Y and V. Kagan-Zur. Production of triploid tomato plants. Ministry of Agriculture IS 60,000.

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1991: Cherry, J.H., A. Handa, Y. Mizrahi, and V. Kagan-Zur. Regulation of tomato ripening and storage life by heat and salt stresses. BARD $33,500.

1991: Kagan-Zur, V., N. Roth-Bejerano and F. Taylor. Cultivation of the local Botswana truffle. AID-CDR $50,000.

1991: Mizrahi, Y. and V. Kagan-Zur. A new approach to the production of long-shelf-life tomato hybrids by the use of various dosages of nonripening genes. Ministry of Agriculture, N.I.S.20,000.

1992: Kagan-Zur, V., N. Roth-Bejerano and F. Taylor. Cultivation of the local Botswana truffle. AID-CDR $50,000.

1992: Kagan-Zur, V. and N. Roth-Bejerano. Cultivation of the French black truffle *Tuber melanosporum* in Israel. Moriah Fund $15,000.

1992: Roth-Bejerano, N and . V. Kagan-Zur .Truffle cultivation in Israel.. Southern R&D I.S.35,000.

1992: Kagan-Zur, V. and N. Roth-Bejerano. Cultivation of *Terfezia boudieri* a north African truffle (AID-MERC) $30,000

1993: Kagan-Zur, V. and Roth-Bejerano, N. Truffle cultivation in Israel.. Southern R&D I.S.30,000.

1993: Kagan-Zur, V., N. Roth-Bejerano and F. Taylor. Cultivation of the local Botswana truffle. AID-CDR $50,000.

1993: Kagan-Zur, V. and N. Roth-Bejerano. Cultivation of *Terfezia boudieri* a north African truffle (AID-MERC) $24,000.

1994: Kagan-Zur, V. and Roth-Bejerano, N. Truffle cultivation in Israel.. Southern R&D I.S.45,000.

1994 Kagan-Zur, V. and Roth-Bejerano, N. Cultivation of the French black truffle *Tuber melanosporum* in Israel. Moriah Fund $5,000.

1994 Kagan-Zur, V. and Roth-Bejerano, N. Use of RAPD markers to identify *T. leonis* mycorrhiza. Seed money, I.S.15,000

1994: Kagan-Zur, V. and N. Roth-Bejerano. Cultivation of *Terfezia boudieri* a north African truffle. (AID-MERC) $19,000.

1995 Kagan-Zur, V. and N. Roth-Bejerano. Cultivation of *Terfezia boudieri* a north African truffle. (AID-MERC) $19,000

1996 Kagan-Zur, V. and N. Roth-Bejerano. Sustainable domestication of indigenous fruit trees: interactions between soil and biotic resources in some drylands of Southern Africa. (EU-INCO-DC) ECU 36,000

1997 Kagan-Zur, V. and N. Roth-Bejerano. Sustainable domestication of indigenous fruit trees: interactions between soil and biotic resources in some drylands of Southern Africa. (EU-INCO-DC) ECU 36,000

1997 Roth-Bejerano, N. and V. Kagan-Zur. Use of soil cooling for truffle production in Israel. (Stern-Tzoref Fund) $ 17,000

1998 Kagan-Zur, V. and N. Roth-Bejerano. Sustainable domestication of indigenous fruit trees: interactions between soil and biotic resources in some drylands of Southern Africa. (EU-INCO-DC) ECU 36,000

1998. Kagan Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 200,000 NIS.

1999. Kagan Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 404,000 NIS

2000 Kagan Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 187,000 NIS

2000 Kagan-Zur, V., Roth-Bejerano, N., Ilan, A., and Hayat, E. Developing a method for T. melanosporum mycorrhized microporopagated oak seedlings. Keren Kayemet LeIsrael. 60,000 NIS

2000 Danai, O., Luzzatti, Y., Kagan-Zur, V., and Roth Bejerano, N. Cultivating Quality truffles. Agricultural Research Authority, Chief Scientist Fund. 11,000 NIS.

2001 Kagan Zur, V., Bustan, A. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 247,000 NIS

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2002 Bustan, A., Kagan Zur, V.,. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 247,000 NIS

2002 Kagan-Zur, V., Roth-Bejerano, N., Ilan, A., and Hayat, E. Developing a method for T. melanosporum mycorrhized microporopagated oak seedlings. Keren Kayemet LeIsrael. 60,000 NIS

2002 Kagan-Zur, V., Roth-Bejerano, N & **the** Namibian MAWRD. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. AID-CDR $ 35,000

2003 Bustan, A., Kagan Zur, V.,. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 155,000 NIS

2003 Kagan-Zur, V., Roth-Bejerano, N & Namibian MAWRD. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. AID-CDR $ 35,000

2004 Kagan-Zur, V., Roth-Bejerano, N & the Namibian MAWRD. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. AID-CDR $ 35,000

2004 Bustan, A., Kagan Zur, V.,. and Roth-Bejerano N. Introduction of *Tuber melanosporum*, the black Perigord truffle into Israel. Agricultural Research Authority. Marketing oriented research. 30,000 NIS

2005 Kagan-Zur, V., Roth-Bejerano, N & the Namibian MAWRD. Co-cultivation of a Kalahari Desert truffle and watermelon for commercial purposes. AID-CDR $ 35,000

Research Experience

Photosynthesis and photorespiration
Plant microbodies
Nitrate metabolism isolation of organelles, enzymology, oxygen evolution and CO_2 fixation
Molecular biology: PCR based molecular studies, RFLP fingerprinting, Protein profiles, isoenzymes.
Tomato postharvest physiology, genetics and tissue culture
Mycorrhizal Symbiosis, Truffle cultivation

Research Interests

Molecular diversity,
Physiology and ecology of mycorrhizal fungi.

Truffle cultivation

Synopsis of past and current research.

Publications cited are included in "Chapters in collective books" or "Refereed articles".

1. Compartmentation of calvin cycle enzymes (M.Sc. & Ph.D).

Non funded research. The pentose phosphate shunt and the photosynthetic carbon fixation cycle (Calvin cycle) metabolic pathways have most of their biochemical steps in common (though they work in opposite directions). The enzymes of the pentose shunt were thought to be located in the cell cytoplasm and the Calvin cycle enzymes in the chloroplast's stroma. We postulated that both pathways are located in microbodies, most of them attached to the chloroplasts during daylight hours and detached following periods of darkness. The CO_2 fixation direction is driven by ATP generated by light energy, while the opposite direction, the pentose shunt, unfolds in the absence of ATP, or when pentose sugars are in demand. We showed that the first enzymes of the Calvin cycle, which are unique to this cycle, can be found associated with the chloroplast following light pretreatment but also appear, though at a lower level, in the cytoplasmic particular fraction (microbodies) following prolonged darkness. We also demonstrated that the chloroplast envelope react differently to electron microscope stains depending on whether they were isolated from dark- or light-pretreated leaves and that chloroplasts show a different electrofocusing point following the same pretreatments. In addition, we showed that intact chloroplasts isolated from dark-pretreated leaves emit less oxygen than those isolated from light-pretreated leaves, and that oxygen evolution in dark-derived chloroplasts is enhanced very considerably by the addition of a dark-derived microbody fraction and much less so by the addition of light-derived microbodies. (Kagan-Zur & Lips, 1974, 1975; 1983; 1987; Kagan-Zur, Friedlander & Lips 1980).

2. Bacteriophage Mu integration mode, and the bacterial cell cycle (Post doc and beyond).

Non funded research. Successful use of bacteriophage Mu vectors to introduce molecularly engineered genes of the *E. coli* cell cycle (Donachie et al., 1983; Dewar et al. 1989) suggested that bacteriophage Mu's initial integration upon infection of a host may be into existing gaps in the chromosome DNA, mainly into the replication forks. We have shown that this was not the case by demonstrating no preference to replication forks (Sivan, Zaritzki & Kagan-Zur, 1988).

3. Manipulating post harvest flavour and storage potential of tomato fruits.

This research (1984-1992) was funded by the Ministry of Agriculture, the Ministry for Industry and Trade, US-BARD, and the Israel Endowment Fund (see "Report list").

I. *Physiological studies aimed at improving taste of tomato varieties bred using long-shelf life genes, known to reduce palatability.*

a. We showed that irrigation with saline water at certain stages of the tomato plant life cycle, namely starting from fruit set by the initial flower bunch, avoids adverse effects of saline irrigation on yield while enhancing fruit flavour considerably (Mizrahi et al. 1988). Tomato fruits attain full flavour potential when picked ripe. The modern practice of picking tomatoes at the breaking point of green to red (to assure longer shelf life) leads to reduced flavour. We studied the potential for picking fruits containing long-shelf-life genes when ripe. This makes it possible to pick the tomatoes in bunches, particularly in the case of small cocktail tomatoes (Kagan-Zur & Mizrahi 1993).

b. The effects of heat treatment on post harvest fruit ripening of normal tomatoes was also studied with the same aim of prolonging shelf life. We did manage to prolong shelf life, but unfortunately we lost flavour altogether (Kagan-Zur et al. 1996).

c. Breeding tomatoes harboring a lower ratio of non-ripening alleles to ripening ones. We obtained tetraploid tomatoes and studied them (Kagan-Zur & Mizrahi, 1987). Given an equal number of cells per fruit, such polyploid fruits are expected to be larger than normal tomatoes, as they have a double dose of DNA per cell. Yet the tetraploid fruits turned out to be smaller. Auto- and odd-numbered

polyploids have few seeds or none. Low seed number in turn result in low auxin production, leading to underdeveloped fruit size (barren plants). Auxin treatments then enabled us to obtain regular sized fruits on polyploid tomato plants (Kagan-Zur, Yaron-Miron & Mizrahi, 1991 Kagan-Zur, Livne & Mizrahi, 1992).

II. Tetraploid tomatoes may be rather easily obtained through disruption of spindle fibers during cell division, but this method would just double the chromosome complement without altering the allele ratio – which was our aim. We realised that the best way to obtain a change of ratio would be to seek an odd numbered chromosome complement – mainly triploids. We therefore attempted to obtain triploid plants directly from endosperm tissue. However, we got wild proliferation (calli) but not full plant regeneration (Kagan-Zur, Mills & Mizrahi, 1990). But triploids sometimes occur in tomato fields. These were presumed to be due to an endosperm cell replacing an aborted fertilised egg – at a ratio of one triploid per about 1000 seedlings; the female would then be the donor of a double chromosome complement and the male the donor of the single complement. Since in practice the male is the carrier of the long-shelf-life gene, we believed we might obtain the desirable triploids by screening regular fields. Although such spontaneous triploids were found, analysis revealed that mostly the male was the double donor (Kagan-Zur et al., 1991; Lapidot et al., 1995). The project was discontinued as each of the researchers involved moved into other research fields.

4. Mycorrhizal associations:

I. Study of desert truffles: Most desert truffles are the fruiting bodies of mycorrhitic fungal species belonging to the genus *Terfezia*. Though considered inferior to European forest truffles, they are prized for their flavour and nutritional value by desert dwellers. To this day they are collected from the wild. We are studying several truffle species of this genus, both with a view to cultivation and as a model of truffle symbiosis.

a. Israeli truffles: Israeli Negev truffles are collected by Beduins during March and April and sold for prices ranging from 50 to 150 shekels per kg.

i. *Potential of development as agricultural crops*. This study was supported by the Israeli Marketing Board, followed by the Israel Endowment Fund and then the Jewish Agency and Ministry of Industry & Trade between the years 1985-1990.

We succeeded in isolating truffle mycelia and mycorrhizing a host root system with the truffle (Roth-Bejerano, Livne & Kagan-Zur, 1990). We now needed to be able to track the mycorrhizal fungus in the roots of out-planted seedlings. To do so, we proceeded to develop an appropriate molecular tool (see below). However, the project was discontinued when economic calculations predicted that desert truffle cultivation on perennial plants was not worthwhile for Israeli farmers.

ii. *Molecular studies*. Development of genetic markers specific to truffles and studying the possibility of identifying these markers in mycorrhizas were the initial aims of this study. The study was supported by a Seed Money grant, and later in part by an EU grant.

RAPD markers were found to be a bit less reliable than rRNA gene markers. We identified two size variants of the ITS region of the rRNA genes and three RFLP patterns. Sequencing of the three RFLP variants showed a 4% difference between the two equal-sized fragments and the larger one (Holdengraeber et al., 2001). Such a difference is ordinarily taken to indicate a separate species. Using additional markers we were, lately, able to show the likelihood of this type being a separate species (Ferdman et al. Submitted). The ITS distinct profiles also enabled us to prove that lobed truffles may be formed through fusion of separately initiated fruit bodies (Holdengraeber et al., 2001), thus predicting no limit on no. of close by fruit-body initiations. A double-profiled mycelium was isolated and was found to harbour two ITS forms within a common cytoplasm (Aviram, Roth-Bejerano & Kagan-Zur, Anton. Leeuw Int. J. 2004). It seems as though the two forms may be carried in two different nuclei

suggesting a long tem dikaryon in ascomycetes (Roth-Bejarano, Li & Kagan-Zur, Anton. Leeuw Int. J. 2004)

iii. *Physiological studies*: In conformity with their high pH and calcium preference, we found that the level of symbiosis formation by Israeli desert truffles rises when iron content in the medium is low (Kagan-Zur et al. 1994). External Ca^{2+} stimulated mycelial growth of this truffle in both liquid media and solidified substrates. The response to Ca^{2+} was very faint in well-aerated culture but pronounced in mycelia immersed in the medium, indicating a role for Ca^{2+}in overcoming hypoxia (Roth-Bejerano, Mendlinger & Kagan-Zur, Mycoscience 2004).

iv. The development of *in vitro Cistus incanus* root cultures (see below) enabled us to identify one root clone and two *Terfezia boudieri* isolates capable of forming endomycorrhiza under low phosphate conditions. All other clone-isolate combination resulted in ectomycorrhiza formation under these low P conditions (Zaretsky et al. Plant Cell Rep. In press). Analyzing gene expression of this clone as compared to a non endomycorrhiza forming clone, in combination with two fungal isolated: an endo-mycorrhiza capable one, and an a uniquely ectomycorrhiza forming one revealed several genes expressed exclusively under ecto or endo mycorrhiza conditions (Zaretsky et al. submitted).

b. Kalahari Terfezia: These low pH, low calcium favoring truffles appear in May-June. They are collected by Bushmen and sold locally or exported to Europe.

The research was supported by two AID-CDR grants, and by an EU grant.

i. *Identifying a host plant*. No host of Kalahari Terfezias was known. As traditional methods of defining a host were unsuccessful (Taylor et al., 1995), we tried a molecular approach. A molecular method we developed for tracing truffle mycorrhizas on host roots enabled us to identify a local Kalahari variety of watermelon as a *bona fide* symbiont (Kagan-Zur et al. 1999).

ii. *Phylogenetic placement of Kalahari truffles*. Further molecular analyses indicated that the Kalahari truffles were falsely placed in the Terfezia and Choiromyces genera (Ferdman et al. Mycol. Res. 2005) and new genera were formed to accommodate them.

iii. *Potential cultivation*: Watermelon is a tempting candidate as a host for co-cultivation of truffles. We were lately (2002) granted an AID-CDR grant to pursue the subject.

c. Moroccan terfezias. Although mycorrhitic fungi – truffles included – are not very exclusive in their choice of plant partner, they exhibit some preferences. *T. boudieri* enters into symbiosis with both perennial and annual *Helianthemum* species. Annual couples may prove to be more amenable to modern agricultural practices than perennial couples, and studies aimed at assessing this possibility were supported by an AID-MERC grant. Unfortunately collaboration with Morocco proved to be problematic. We are about to start research on our own, as annual truffles have been lately defined among Israeli truffles.

II. Introduction of *Tuber melanosporum*, the black Périgord truffle into Israel. European forest truffles are a culinary delicacy used as a spice. They command very high prices in specialty markets. The initial research was supported by the Moriah Fund, then taken over by the Jewish agency, followed by the Stern Fund; the research is now supported by the Market Oriented Program, Chief Scientist of the Ministry of Agriculture.

a. *Support of oak-truffle plantations*, initiated by Pinkas & Shabi from the Volcani Institute. The plantation maintained the *T. melanosporum* mycorrhiza fairly well (Kagan-Zur et al., Plant & Soil, 2001). First truffle was collected January 2000 (Kagan-Zur et al. Mycol. Veget. Mediter, 2000)

b. Cistus-truffle research: We are seeking to develop a more intensive system of agricultural cultivation based on an indigenous host plant. *T. melanosporum* mycorrhizes the local wild shrub

Cistus incanus. We successfully effected symbiosis between the black Périgord truffle and cistus. Mycorrhization was obtained using either spores, or detached mycorrhized roots, or donor plants. We have developed potentially useful growth media combinations, (Bustan et al. Israel J Plant Science In Press) have proved that soil cooling in summer can help maintain a strong presence of Tuber mycorrhizas (Roth-Bejerno, Sela & Kagan-Zur, Mycol. Veget. Mediter. 2003) and have elaborated methods for efficient proliferation of chosen plants (Mills et al. Agr Med 2002), as well as molecular methods for identifying *T. melanosporum* as the symbiotic partner in roots. We have developed a method for assessing proliferation of *Tuber* mycelium in growth media and a procedure for rapid production of reliable inoculating material through maintenance of *T. melanosporum* mycelia in symbiosis with detached *Agrobacterium rhizogenes*-transformed cistus roots (Wenkart et al., Plant Cell Rep. 2001). This dual culture system is currently used for basic studies on the initial stages of *Tuber melanosporum* mycorrhiza (Ventura et al. Plant Cell, Tissue & Organ Culture, In press).

c. The usefulness of mycorrhizing oak trees with *Tuber aestivum*, a summer truffle, for Israeli oak stands, to serve both as a plant growth enhancer and an attraction, is being studied, funded by the KKL

III. Mycorrhizal associations of desert fruit-trees. This research was supported by an EU grant. For under-developed countries, cultivating wild but familiar fruits may be preferable to introducing foreign species, as the former are more acceptable to local palates and better adapted to the local environment. The survival of wild fruit trees in the harsh Kalahari environment is supposed to be assisted by or even dependent on mycorrhizas. We have studied mycorrhizas of wild trees of interest at their native sites. All young trees have been found heavily mycorrhized. Some trees retain heavy mycorrhization even at maturity (Bohrer et al., J. Veg. Sci. 2001), while others seem to become less mycorrhized with age. Results indicate an effect of mycorrhiza on soil structure, and effect of soil source as well as fungal source on mycorrhizal level of experimental seedlings (Bohre et al. J. Arid Environ. 2003) We used molecular techniques to study the variability of mycorrhizal fungi among trees of one species, *Vangueria infausta*, at different sites (Bohrer et al. in press), to assess the usefulness of a single mycorrhizal fungus as a universal inoculant..