



Agricultural Research Organization (ARO) Volcani Center

State of Israel / Ministry of Agriculture and Rural Development

Eli Zaady, Ph.D. (Researcher)

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CV Research Interests / Job description



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Department of Natural Resources,
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Researcher of open spaces

Researcher (Grade A)

Research Interests / Job description

Biological soil crusts; succession of BSC, soil stabilization, erosion prevention and runoff production.

Biogeochemistry; C and N cycles in desert soils.

Livestock grazing and geophytes.

Livestock grazing in semiarid organic agro-ecosystems and natural pasture.

Agro-tourism in pasture land and planted forests in semiarid areas.

Reclamation of an old phosphate mining fields in the central Negev Desert.

Soil stabilization in dry afforested areas.

Aeolic erosion.

Micro-morphology and chemistry of atmospheric particles.

Rain generation in dry-lands via artificial heat island technique.

Leakage of biocide materials from agricultural fields and pollutant dispersion by wind and water, to natural and urban spaces.

Citations

I. List of publications

Kenealy, W., **Zaady, E.**, Du Preez, J. C., Stiglitz, B. and Goldberg, I. (1986) Biochemical aspect of fumaric acid accumulation by *Rhizopus arrhizus*. *Applied Environmental Microbiology* 52: 128-133.

Zaady, E. and Okon, Y. (1990). Culture condition affecting *Azospirillum brasilense* Cd cell aggregation and adsorption to maize roots. *Soil Biology & Biochemistry* 22: 1103-1107.

Zaady, E., Perevolotsky, A. and Okon, Y. (1993). Promotion of plant growth by inoculum with aggregated and single cell suspensions of *Azospirillum brasilense* Cd. *Soil Biology & Biochemistry* 25: 819-823.

Zaady, E., Okon, Y. and Perevolotsky, A. (1994). Growth response of Mediterranean herbaceous swards to inoculation with *Azospirillum brasilense*. *Journal of Range Management* 47: 12-15.

Zaady, E. and Perevolotsky, A. (1995). Enhancement of growth and establishment of Oak (*Quercus ithaburensis* Decaine) seedling by inoculation with *Azospirillum brasilense*. *Forest Ecology Management* 72: 81-83.

Zaady, E., Groffman, P. and Shachak, M. (1996). Litter as a regulator of nitrogen and carbon dynamics in macrophytic patches in Negev desert soils. *Soil Biology & Biochemistry* 28: 39-46.

Karnieli, A., Shachak, M., Tsoar, H., **Zaady, E.**, Kaufman, Y., Danin, A. and Porter, W. (1996). The effect of microphytes on the spectral reflectance of vegetation in semi-arid regions. *Remote Sensing of Environment* 57: 88-96.

Zaady, E., Groffman, P. and Shachak, M. (1996). Release and consumption of snail feces in Negev desert soils. *Biology & Fertility of Soils* 23: 399-404.

Zaady, E., Gutterman, Y. and Boeken, B. (1997). The germination effects of cyanobacterial soil crust on mucilaginous seeds of three desert plants: *Plantago coronopus*, *Reboudia pinnata* and *Carrichtera annua*. *Plant and Soil* 190:247-252.

Offer, Z., **Zaady, E.** and Shachak, M. (1998). Aeolian particles input to soil surface at the northern limit of the Negev desert. *Arid Soil Research and Rehabilitation* 1: 55-62.

Zaady, E., Groffman, P. and Shachak, M. (1998). Nitrogen fixation in macro- and microphytic patches in the Negev desert. *Soil Biology and Biochemistry* 30: 449-454.

Masalha, R., **Zaady, E.**, Offer, Z. Y., Gulman, R., and Herishanu, Y. O. (1998). Meteorological conditions and stroke in southern Israel. *Journal of Neurology* 245: 472-473.14.

Shem-Tov, S., **Zaady, E.**, Groffman, M. P. and Gutterman, Y. (1999). Soil carbon content along rainfall gradient and germination: a potential mechanism for regulating of *Plantago coronopus*. *Soil Biology and Biochemistry* 31: 1209-1217.

Itzigsohn, R., Burdman, S., Okon, Y., **Zaady, E.**, Yonatan, R. and E. Perevolotsky. (2000). Plant-growth promotion in natural pastures by inoculation with *Azospirillum brasilense* under sub-optimal conditions. *Arid Soil Research and Rehabilitation* 14: 151-159.

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Eldridge, D.J., **Zaady, E.** and Shachak, M. (2000). Infiltration through three contrasting biological soil crusts in patterned landscapes in the Negev, Israel. *Catena* (40)3, 323-336.

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- Zaady, E.**, Bouskila, A. (2002). Patterns of lizard burrows distribution in biological soil crusts of successional age in arid sandy region. *Journal of Arid Environments* 2: 235-246.
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- Shem-Tov, S., **Zaady, E.** and Gutterman, Y. (2002). Germination of *Carrichtera annua* seeds on soil samples collected along a rainfall gradient in the Negev desert. *Israel Journal of Plant Sciences* 50: 115-120.
- Karnieli, K., Gabai, A., Ichoku, C., **Zaady, E.** and Shachak, M. (2002). Temporal dynamics of soil and vegetation spectral responses in a semiarid environment. *International Journal of Remote Sensing* 23: 4073-87.
- Eldridge, D.J., **Zaady, E.**, Shachak, M. (2002). Microphytic crusts, shrub patches and water harvesting in the Negev desert: The shikim system. *Landscape Ecology* 17: 587-597.
- Akuja, T., Godonu, K.G., Kraaij, T., Mwangi, M., Oguzoglu, I. and **Zaady, E.** (2002). Soil characteristics of crusted outside and sub-canopy areas of four dominant shrubs in the Negev Desert. *International Journal of Agriculture and Rural Development* 3: 162-170.
- Zaady, E.**, Groffman, P.M., Shachak, M. and Wilby, A. (2003). Consumption and release of nitrogen of harvester termite *Anacanthotermes ubachi* Navas in northern Negev desert. *Soil Biology & Biochemistry* 35: 1299-1303.
- Zaady, E.**, Boeken, B., Ariza, C. and Gutterman, Y. (2003). Light, temperature and substrate effects on the germination of three *Bromus* species in comparison with their abundance in the field. *Israel J. Plant Sciences* 51:267-273.
- Zaady, E.**, Levacov, R. And Shachak, M. (2004). Application of the herbicide, Simazine, and its effect on soil surface parameters and vegetation in a patchy desert landscape. *Arid Land Research and Management* 18: 397-410.
- Boeken, B., Ariza, C., Gutterman, Y. and **Zaady, E.** (2004). Post maturation environmental factors affecting dispersal, germination and distribution of *Stipa capensis* plants among landscape patches in the northern Negev Desert of Israel. *Ecological Research* 19: 533-540.
- Akuja, T., **Zaady, E.** (2004). Effect of soil erosion on the biodiversity of soil crust within the Ziporim basin of Israel. *International Journal of Agriculture and Rural Development* 5: 1-6.
- Akuja, M., **Zaady, E.**, Ward, D. and Gutterman, Y. (2005). Effect of soil erosion and land use on soil quality in the semiarid Negev Desert of Israel. *East African Journal of Life Sciences* 5: 67-74.
- Zaady, E.** (2005). Seasonal changes and nitrogen cycling in a patchy Negev desert, a review. *Arid Land Research and Management* 19: 111-124.
- Burgheimer, J., Wilske, B., Maseyk, K., Karnieli, A., **Zaady, E.**, Yakir, D., and Kesselmeier, J.T. (2006). Relationships between Normalized Difference Vegetation Index (NDVI) and carbon fluxes of biologic soil crusts assessed by ground measurements. *Journal of Arid Environments* 64: 656-669.
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- Grishkan, I., **Zaady, E.**, Nevo, E. (2006). Soil crust microfungi along a southward rainfall aridity gradient in the Negev desert, Israel. *European Journal of Soil Biology* 42:33-42.
- Offer, Z.Y., **Zaady, E.** (2006). Aeolian accumulation of organic and inorganic sediments in a semi-arid watershed in the northern Negev desert, Israel. *Int. Journal on Environmental, Cultural, Economic and Social Sustainability* 4: 153-164.
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Vanderstraeten, P., Forton, M., Lénelle, Y., Meurrens, A., Carati, D., Brenig, L., Offer, Z.Y. and **Zaady, E.** (2010). Elevated PM₁₀ concentrations and high PM_{2.5}/PM₁₀ ratio in the Brussels urban area during the 2006 Car-Free Sunday. *International Journal on Environment and Waste Management* 3: 264-279.

Zaady, E. Offer, Y.Z. (2010). Biogenic soil crusts in arid zones increase soil depth by incorporating aeolian deposition. *Sedimentology* 57: 351-358.

Zaady, E., Ben-David, E.A., Sher, Y., Tzirkin, R. and Nejdat, A. (2010). Inferring biological soil crust successional stage using combined PLFA, DGGE, physical physical and biophysiological analyses. *Soil Biology & Biochemistry* 42: 842-849.

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Ben-David, E. A., **Zaady, E.**, Sher, Y., Nejdat, A. (2011). Assessment of the spatial distribution of soil microbial communities in patchy arid and semiarid landscapes of the Negev Desert by using combined PLFA and DGGE analyses. *FEMS Microbiol Ecol.* 76: 492-503.

Dody, A., Hakmon, R., Asaf, B., **Zaady, E.** (2011). Indices to monitor biological soil crust growth rate - lab and field experiments. *Natural Sciences* 3: 478-483.

Maestre T.F., Quero, L.J., Gotelli, J. N., Escudero, A., Ochoa, V., Delgado-Baquerizo, M., García-Gómez, M., Bowker, A. M., Soliveres, S., Escolar, C., García-Palacios, P., Berdugo, M., Valencia, E., Gozalo, B., Gallardo, A., Blones, J., Boeken, B., Bran, D., Conceição, A.A., Cabrera, O., Chaieb, M., Derak, M., Eldridge, J. D., Espinosa, I. C., Florentino, A., Gaitán, J., Gatica, M.G., Ghiloufi, W., Gómez-González, S., Gutiérrez, R.J., Hernández, M. R., Huang, X., Huber-Sannwald, E., Jankju, M., Miriti, M., Monerri, J., Mau, L.R., Morici, E., Naseri, K., Ospina, A., Polo, V., Prina, A., Pucheta, E., Ramírez-Collantes, A. D., Romão, R., Tighe, M., Torres-Díaz, C., Val, J., Veiga, P. J., Wang, D., **Zaady, E.** (2012). Plant Species

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Zaady, E., Arbel, S., Barkai, D., Sarig, S. (2013). Long-term impact of agricultural practices on biological soil crusts and their hydrological processes in a semiarid landscape. *Journal of Arid Environments* 90: 5-11.

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Delgado-Baquerizo, M., Maestre, T.F., Gallardo, A., Bowker, M.A., Wallenstein, M.D., Quero, J.L., Ochoa, V., Gozalo, B., García-Gómez, M., Soliveres, S., García-Palacios, P., Berdugo, M., Valencia, E., Escolar, C., Arredondo, T., Barraza-Zepeda, C., Bran, D., Carreira, J.A., Chaieb, M., Conceição, A., Derak, M., Eldridge, D.J., Escudero, A., Espinosa, C.I., Gaitán, J., Gatica, M.G., Gómez-González, S., Guzman, E., Gutiérrez, J.R., Florentino, A., Hepper, E., Hernández, R.M., Huber-Sannwald, E., Jankju, M., Liu, J., Mau, R.L., Miriti, M., Moneris, J., Naseri, K., Noumi, Z., Polo, V., Prina, A., Pucheta, E., Ramírez, E., Ramírez-Collantes, D.A., Romão, R., Tighe, M., Torres, D., Torres-Díaz, C., Ungar, E.D., Val, J., Wamiti, W., Wang D., **Zaady E.** (2013). Aridity decouples soil C, N and P biogeochemical cycles in global drylands. *Nature*, 502: 672 - 676.

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Amir, R., Kinast, S., Tsoar, H., Yizhaq, H., **Zaady, E.**, Ashkenazy, Y. (2014). The effect of wind and precipitation on vegetation and biogenic crust covers in the Sde-Hallamish sand dunes. *Journal of Geophysical Research* 119, 437-450.

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Paz-Kagan, T., Shachak, M., **Zaady, E.**, Karnieli, A. (2014). Assessment of afforestation management systems by soil quality and primary productivity in a semi-arid area. *Geoderma*, In Press.

Paz-Kagan, T., Shachak, M., **Zaady, E.**, Karnieli, A. (2014). Landscape changes in runoff-harvesting systems of desertified shrubland, Israel: spatio-temporal analysis with respect to drought years. *Agriculture, Ecosystems & Environment*, In Press.

II. Articles in reviewed journals in Hebrew (Abstract in English).

Zaady, E., Perevolotsky, A., and Okon, Y. (1990). The effects of Azospirillum inoculation on Oak seedlings. *Hassade'* 70: 1910-1912.

Zaady, E., Okon, Y., Yonatan, R. and Perevolotsky, A. (1992). Inoculation and fertilization effects on the productivity of natural pasture in temperate and semi-arid regions of Israel. *Hassade'* 72: 484-488.

Levacov, R., and **Zaady, E.** (1999). The effect of herbicides on resources flow in patchy Negev desert landscape. *Ecology and Environment* 5: 112-121.

Zaady, E. (1999). Nitrogen cycle and the Negev desert patchiness. *Ecology and Environment* 5: 70- 76.

Zaady, E. (1999). The role of microphytic soil crusts in desert ecosystems. *Ecology and Environment* 5: 77-84. <http://telem.openu.ac.il/courses/c20237/crusts.htm>

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Zaady, E., Sher, Y., Ronen, Z., Nejdat, A. (2012). Changes in soil biological characteristics and shrub mortality following drought in the northern Negev desert. *Ecology and Environment* 3: 44-52.

Golodets, C., Sternberg, M., Kigel, J., Boeken, B., Dolev, A., Hadar, L., Henkin, Z., **Zaady, E.**, Betzael, Y., Arnon, A., Seligman, N.G., Ungar, E.D. (2013). Relationship between the amount of rain and the biomass production in pasture, along the rainfall gradient in Israel and its implications for climate change scenario. *Ecology and Environment* 4: 148-158.

III. Books, book chapters and invited reviews (indicate name of editor).

Okon, Y., Bar, T., Tal, S. and **Zaady, E.** (1991). Physiological properties of *Azospirillum brasilense* involved in root growth promotion. In: Nitrogen fixation with non-legumes (Skinner, F.A, Boddey, R.M. Fendrik, I., eds.), pp. 113-125. Kluwer Academic Pub. Amsterdam.

Shachak, M., Pickett, S. T. A., Boeken, B. and **Zaady, E.** (1999). Managing patchiness, ecological flows, productivity, and diversity in dry lands: Concepts and applications in the Negev desert. In: Arid lands management - Toward ecological sustainability. (Hoekstra, T., M. Shachak, Eds.), pp. 254-263. University of Illinois Press, Urbana.

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Groffman, P.M., **Zaady, E.** and Shachak, M. (2005). Microbial contributions to biodiversity at organism, landscape, and ecosystem scales. In: Shachak M., Gosz J.R., Pickett S.T.A. and Perevolotsky A. (eds.), Biodiversity in Drylands - towards a unified framework and identification of research needs. Oxford University Press, Inc. Oxford, pp. 109-121.

Bouskila, A., Ben-Natan, G., Ziv, Y., Lubin, Y., **Zaady, E.** (2006). Comparative biological studies of the open areas in Yamin Plateau (NRC). BGU publication.
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Offer, Y.Z. and **Zaady, E.** (2008). Applicative methods for aeolian particle study in desert environment. Chapter 14b. In: Hare, P. (ed.), Transfer of Technology. pp. 283-297.

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Boeken, B., **Zaady, E.** and Shachak, M. (2010). Developing comprehensive research of the system dynamics of a site - Long and short term studies at Park Shaked LTER station in the northern Negev desert of Israel. European-LTER Publisher.

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Ziv, Y., **Zaady, E.**, Tsoar, A., Karnieli, A., Voltsak, M., Bouskila, A., Sigal, Z., Renan, E. (2010). National program for monitoring biodiversity - internal desert sands. pp. 54-57. In: Berg, N., Perevolotsky, A. (Eds.), National Program for Monitoring Biodiversity - Open Spaces in Israel. ILTER-Marag. (In-Hebrew).

IV. Allowed patents:

Patent No. 168527. Biological Soil Crusts - Soil stabilization.

V. Articles of symposia proceedings (reviewed).

Groffman, P., **Zaady, E.** and Shachak, M. (1999). Microbial contribution to biodiversity at organism, landscape and ecosystem scales. In: Biodiversity in Drylands; Towards a Unified Framework and Identification Research Needs. pp. 32-39. Ben-Gurion University, Beer-Sheva, Israel.

Eldridge, J. D., **Zaady, E.**, Shachak, M. and Myers, C. (1999). Control of desertification by microphytic

crusts in a Negev desert shrubland. In: Desertification and Soil Processes: Sixth International Rangeland Congress Proceedings 1: 111-113. .NSW, Australia.

Akuja, M., Avni, Y., **Zaady, E.**, Gutterman, Y. (2001). Soil erosion effects as indicators of desertification processes in the northern Negev. In: Soil Erosion Research for the 21st Century. (eds., Ascough, J.C II., Flanagan, D.C.) pp. 595-598. American Society of Agricultural Engineers Publication. Honolulu, Hawaii.

Student education: Ecological field studies



Research activities;

- soil degradation,
- livestock grazing and
- biological soil crusts [biocrust].

