

## **Steven E. Smith**

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### **Education**

Ph.D., Plant Breeding, Cornell University, 1984. Advisor: R.P. Murphy.

M.S., Plant Breeding, Cornell University, 1982. Advisor: D.R. Viands.

B.S., Plant Science (Agronomy Specialization), University of California, Davis, 1979.

### **Employment history**

Associate Professor, School of Natural Resources, 1999–, and Department of Plant Sciences, University of Arizona, 1989–

Assistant Professor, Department of Plant Sciences, University of Arizona, 1984–1989.

Postdoctoral Research Associate, University of Wisconsin-Madison, 1984.  
Supervisor: E.T. Bingham, Department of Agronomy.

Graduate Research Assistant, Cornell University, 1979–1984.  
Supervisor: R. P. Murphy, Department of Plant Breeding and Biometry.

### **Teaching responsibilities**

Field Botany (Renewable Natural Resources 230R), Field Botany Laboratory (RNR 230L), Fall Semester; 230R (on-line), Spring Semester.

Plant Biology (Plant Sciences 240), Fall Semester.

Grazing Ecology and Management (Range Management 436A/536A), Spring Semester.

### **Publications**

Routson, Kanin J., Gayle M. Volk, Christopher M. Richards, Steven E. Smith, Gary Paul Nabhan, and Victoria Wyllie de Echeverria. 2012. Genetic variation and distribution of Pacific crabapple. *J. Amer. Soc. Hort. Sci.* 137:325-332.

Qin, Y., R. Wysocki, A. Somogy, Y. Feinstein, J. Franco, T. Tsukamoto, D. Damayanthi, C. Levy, S. Smith, R. Simpson, D. Gang, M. Johnson, and P. Ravishankar. 2011. Sulfinylated azadecalins act as functional mimics of a pollen germination stimulant in *Arabidopsis* pistils. *Plant Journal* 68:800-815.

Smith, Steven E., Tulio Arredondo, Martin Aguiar, Elisabeth Huber-Sannwald, Angel Alpiuche, Armando Alpuche, Armando Aguado, Oscar A. Grageda, Kandres Halbrook, and Cecilia Bottini. 2009. Fine-scale spatial genetic structure in perennial grasses in three environments. *Rangeland Ecol. & Manage.* 62:356-363.

Johnson, Patricia L., Jane L. Hayes, John Rinehard, Walter S. Sheppard, and Steven E. Smith. 2008. Characterization of two non-native invasive bark beetles, *Scolytus schevyrewi* and *Scolytus multistriatus* (Coleoptera: Cuculionidae: Scolytinae). *Can. Entom.* 140:527-538.

Hayes, J.L., P.L. Johnson, A. Eglitis, D.W. Scott, L. Spiegel, C.L. Schmitt, and S.E. Smith. 2008. Response of bark and woodboring beetles associated with western juniper to host volatiles and wounding. *West. J. Applied Forestry* 24:206-215.

Ward, J.P., S.E. Smith, and M.P. McClaran. 2006. Water requirements for emergence of buffelgrass (*Pennisetum ciliare*). *Weed Sci.* 54:720-725.

Smith, S.E., D. Fendenheim, and K. Halbrook. 2006. Epidermal conductance as a component of dehydration avoidance in *Digitaria californica* and *Eragrostis lehmanniana*, two perennial desert grasses. *J. Arid Environ.* 64:238-250.

Ridgeway, S.C., M. Livingston, and S.E. Smith. 2005. Visitor behavior in zoo exhibits with underwater viewing. *Visitor Studies Today* 8:1-10.

Smith, S.E. 2005. Deserts: The living drylands. *Quart. Rev. Biol.* 80:261-262 (Book review).

Smith, S.E. and K. Halbrook. 2004. A plant genetics primer. Basic terminology. *Native Plants J.* 5:105-111.

Smith, S.E., M.R. Haferkamp, and P.W. Voigt. 2004. Gramas. p. 975-1002. *In:* L.E. Moser, B.B. Burson, and L.E. Sollenberger (ed.) *Warm-season (C<sub>4</sub>) grasses*, Am. Soc. Agronomy, Madison, WI.

Smith, S.E. 2004. Breeding synthetic cultivars. p. 205-206. *In:* R.M. Goodman (ed.), *Encyclopedia of Plant & Crop Science*, Marcel Dekker, Inc., New York.

Maren E. Veatch, S.E. Smith, and G. Vandemark. 2004. Shoot biomass production among accessions of *Medicago truncatula* exposed to NaCl. *Crop Sci.* 44:1008-1013.

Fernandez-Gimenez, M.E. and S.E. Smith. 2004. Nitrogen effects on Arizona cottontop and Lehmann lovegrass seedlings. *J. Range Manage.* 57:76-81.

Bean, T.M., M.M. Karpiscak, and S.E. Smith. 2003. A prescription for restoring native vegetation on former agricultural land (Arizona). *Ecol. Restor.* 21:214-215.

Vaughn, Laura V., Jennifer W. MacAdam, Steven E. Smith, and Lynn M. Dudley. 2002. Root growth and yield of differing alfalfa rooting populations under increasing salinity and zero leaching. *Crop Sci.* 42:2064-2071.

Soleri, Daniela, David A. Cleveland, Steven E. Smith, Salvatore Ceccarelli, Stefania Grando, Ram B. Rana, Deepak Rijal, and Humberto Ríos Labrada. 2002. Understanding farmers' knowledge as the basis for collaboration with plant breeders: Methodological development and examples from ongoing research in Mexico, Syria, Cuba and Nepal. p. 19-60. In D.A. Cleveland and D. Soleri (eds.) *Farmers, Scientists and Plant Breeding. Integrating Knowledge and Practice*, CABI Pub., Wallingford, UK.

Soleri, D. and S.E. Smith. 2002. Rapid estimation of broad sense heritability of farmer-managed maize populations in the Central Valleys of Oaxaca, Mexico, and implications for improvement. *Euphytica* 128:105-119.

Idris, A.M., S.E. Smith, and J.K. Brown. 2001. Ingestion, transmission, and persistence of Chino del tomate virus (CdTV), a New World begomovirus, by Old and New World biotypes of the whitefly vector *Bemisia tabaci* (Genn.). *Ann. Appl. Biology* 139:145-154.

Smith, S.E. and Susan R. Winslow. 2001. Comparing perceptions of native status. *Native Plants J.* 2:5-11.

Roundy, B.A., H. Heydari, C. Watson, S.E. Smith, B. Munda, and M. Pater. 2001. Summer establishment of Sonoran Desert species for revegetation of abandoned farmland using line source sprinkler irrigation. *Arid Land Res. and Manage.* 15:23-39.

Cleveland, D.A., D. Soleri, and S.E. Smith. 2000. A biological framework for understanding farmer's plant breeding. *Econ. Bot.* 54:377-394.

Soleri, D., S.E. Smith, and D.A. Cleveland. 2000. Evaluating the potential for farmer and plant breeder collaboration: A case study of farmer maize selection in Oaxaca, Mexico. *Euphytica* 116:41-57.

Smith, S.E., R. Mosher, and D. Fendehheim. 2000. Seed production in sideoats grama populations with different grazing histories. *J. Range Manage.* 53:550-555.

Smith, S.E., E. Riley, J.L. Tiss, and D.M. Fendenheim. 2000. Geographical variation in predictive seedling emergence in a perennial desert grass. *J. Ecology* 88:139-149.

Brown, J., E. Glenn, K. Fitzsimmons, and S.E. Smith. 1999. Halophytes for the treatment of saline aquaculture effluent. *Aquaculture* 175:255-268.

Cleveland, D.A., D. Soleri, and S.E. Smith. 1999. *Farmer Plant Breeding from a Biological Perspective: Implications for Collaborative Plant Breeding*. CIMMYT Economics Working Paper No. 10., CIMMYT, Mexico, D.F.

- Soleri, Daniela and S.E. Smith. 1999. Conserving folk crop varieties: Different agricultures, different goals. p. 135-154. *In* V. D. Nazarea (ed.), *Ethnoecology: Situated knowledge/located lives*. University of Arizona Press, Tucson.
- Smith, S.E. 1998. Variation in response to defoliation between populations of *Bouteloua curtipendula* var. *caespitosa* (Poaceae) with different livestock grazing histories. *Am. J. Bot.* 85:1266-1272.
- Smith, S.E., R.O. Kuehl, I.M. Ray, R. Hui, and D. Soleri. 1998. Evaluation of simple methods for estimating broad-sense heritability in stands of randomly planted genotypes. *Crop Sci.* 38:1125-1129.
- Al-Doss, A. and S.E. Smith. 1998. Registration of AZ-97MEC and AZ-97MEC-ST very nondormant alfalfa germplasm pools with increased shoot weight and differential response to saline irrigation. *Crop Sci.* 38:568.
- Wissuwa, M. and S.E. Smith. 1997. Morphological and physiological characteristics associated with tolerance to summer irrigation termination in alfalfa. *Crop Sci.* 37:704-711.
- Wissuwa, M., S.E. Smith, and M.J. Ottman. 1997. Using crown moisture content to predict plant mortality in drought-stressed alfalfa. *Irrigation Sci.* 17:87-91.
- Livingston, M., B.A. Roundy, and S.E. Smith. 1997. Association of overstory plants and native grasses in southern Arizona. *J. Arid Environ.* 35:441-449.
- Hotchkiss, J. R., S.E. Smith, and W.B. Miller. 1996. Persistence and single-plant productivity in nondormant alfalfa. *Crop Sci.* 36:336-340.
- Soleri, Daniela and Steven E. Smith. 1995. Morphological and phenological comparisons of two Hopi maize varieties conserved *in situ* and *ex situ*. *Econ. Bot.* 49:56-77.
- Smith, S.E., L. Guarino, A. Al-Doss, and D.M. Conta. 1995. Morphological and agronomic affinities among Middle Eastern alfalfas--accessions from Oman and Yemen. *Crop Sci.* 35:1188-1194.
- Keys, R. N., S.L. Buchmann, and S.E. Smith. 1995. Pollination effectiveness and pollination efficiency of insects foraging on *Prosopis velutina* in southeastern Arizona. *J. Appl. Ecol.* 32:519-527.
- Keys, R.N., S.E. Smith, H.L. Mogensen, and E. Small. 1995. Microgametophytic plastid nucleoid content and life history traits of tribe Trifolieae (Fabaceae). *Plant Syst. Evol.* 196:89-98.
- Keys, R.N., S.E. Smith, and H.L. Mogensen. 1995. Variation in generative cell plastid nucleoids and male fertility in *Medicago sativa*. *Sex. Pl. Reprod.* 8:308-312.

- Losoff Rusche, M., H.L. Mogensen, T. Zhu, and S.E. Smith. 1995. The zygote and proembryo of alfalfa: quantitative, three-dimensional analysis and implications for biparental plastid inheritance. *Protoplasma* 189:88-100.
- Al-Doss, Abdullah A., and S.E. Smith. 1995. Performance of Middle-Eastern alfalfa ecotypes in the southwestern USA using traditional and contemporary harvest management practices. *J. Kind Saud University* 7:189-197.
- Smith, S.E., D.W. Johnson, D.M. Conta, and J. R. Hotchkiss. 1994. Using climatological, geographical and taxonomic information to identify sources of mature-plant salt tolerance in alfalfa. *Crop Sci.* 34:690-694.
- Cleveland, D.A., D. Soleri, and S.E. Smith. 1994. Folk crop varieties: Do they have a role in sustainable agriculture. *BioScience* 44:740-751.
- Keys, R.N. and S.E. Smith. 1994. Mating system parameters and population genetic structure in pioneer populations of *Prosopis velutina* (Leguminosae). *Am. J. Bot.* 81:1013-1020.
- Brahim, K. and S.E. Smith. 1993. Annual medic establishment and the potential for stand persistence in southern Arizona. *J. Range Manage.* 48:21-24.
- Zhu, T., H. Lloyd Mogensen, and S.E. Smith. 1993. Heritable paternal cytoplasmic organelles in alfalfa sperm cells: ultrastructural reconstruction and quantitative cytology. *Eur. J. Cell Biol.* 59:211-218.
- Smith, S.E. 1993. Salinity and the production of alfalfa (*Medicago sativa* L.). p. 431-448. *In* M. Pessaraki (ed.). *Handbook of Crop Stress*. Marcel Dekker, Inc., New York.
- Warburton, M. and S.E. Smith. 1993. Regional diversity in nondormant alfalfas from India, North Africa, and Arabia. *Crop Sci.* 33:852-858.
- Dobrenz, A.K., S.E. Smith, D. Poteet, and William B. Miller. 1993. Carbohydrates in alfalfa seed developed for salt tolerance during germination. *Agron. J.* 85:834-836.
- Zhu, Tong, H. L. Mogensen, and S.E. Smith. 1993. Quantitative, three-dimensional analysis of alfalfa egg cells in two genotypes: implications for biparental plastid inheritance. *Planta* 190:143-150.
- Hubbard, T., D.M. Conta, and S.E. Smith. 1993. Seed production and pollen tube growth following cross and self pollinations in *Sphaeralcea laxa* Woot. & Standl. *Southwestern Nat.* 38:331-335.
- Johnson, D.W., S.E. Smith, and A.K. Dobrenz. 1992. Genetic and phenotypic relationships in response to NaCl at different developmental stages in alfalfa. *Theor. Appl. Genet.* 83:833-838.

- Johnson, D.W. and S.E. Smith. 1992. Response to NaCl of alfalfa plants regenerated from non-saline callus cultures. *Plant and Soil* 143:311-315.
- Johnson, D.W., S.E. Smith, and A. K. Dobrenz. 1992. Selection for increased forage yield in alfalfa at different NaCl levels. *Euphytica* 60:27-35.
- Forsthoefel, N.R., H.H. Bohnert, and S.E. Smith. 1992. Discordant inheritance of mitochondrial and plastid DNA in diverse alfalfa genotypes. *J. of Heredity* 83:342-345.
- Zhu, Tong, H. L. Mogensen, and S.E. Smith. 1991. Quantitative cytology of the alfalfa generative cell and its relation to male plastid inheritance patterns in three genotypes. *Theor. Appl. Genet.* 81:21-26.
- Shi, L., H.L. Mogensen, T. Zhu, and S.E. Smith. 1991. Dynamics of nuclear pore density and distribution patterns within developing pollen: Implications for a functional relationship between the vegetative nucleus and generative cell. *J. of Cell Science* 99:115-120.
- Shi, L., T. Zhu, H.L. Mogensen, and S.E. Smith. 1991. Paternal plastid inheritance in alfalfa: plastid nucleoid number within generative cells correlates poorly with plastid number and male plastid transmission strength. *Curr. Genet.* 19:399-401.
- Smith, S.E., A. Al-Doss, and M. Warburton. 1991. Morphological and agronomic variation in North African, and Arabian alfalfas. *Crop Sci.* 31:1159-1163.
- Johnson, D.W., S.E. Smith, and A.K. Dobrenz. 1991. Registration of AZ-90NDC-ST alfalfa germplasm. *Crop Sci.* 31:1098-1099.
- Smith, S.E., D.M. Conta, and U. Bechert. 1990. Pollen load, seed position, and agronomic performance in alfalfa. *Crop Sci.* 30:561-565
- Zhu, Tong, H. L. Mogensen, and S.E. Smith. 1990. Generative cell composition and its relation to male plastid inheritance patterns in *Medicago sativa*. *Protoplasma* 158:66-72.
- Smith, S.E. 1989. Biparental inheritance of organelles and its implications in crop improvement. *Plant Breeding Reviews.* 6:361-393.
- Rodrigues, G.H.S. and S.E. Smith. 1989. Evaluation of screening procedures for breeding creeping-rooted alfalfa. *Crop Sci.* 29:228-230.
- Lee, D.J., T.K. Blake, S.E. Smith, E.T. Bingham, and T.W. Carroll. 1989. Chloroplast genome mapping and plastid ultrastructural analysis of chlorophyll deficient mutants of alfalfa. *Crop Sci.* 29:190-196.
- Smith, S.E. 1989. Influence of parental genotype on plastid inheritance in *Medicago sativa*. *J. of Heredity* 80:214-217.

Smith, S.E. and D.J. Fairbanks. 1989. Effects of pollination method on strain cross yield in lucerne. *Plant Breeding* 102:79-82.

Dobrenz, A.K., D.L. Robinson, S.E. Smith, and D.C. Poteet. 1989. Registration of AZ-GERM SALT II Nondormant alfalfa germplasm. *Crop Sci.* 29:493.

Smith, S.E. and D.J. Fairbanks. 1989. Registration of AZ-88MS and AZ-88NDC, nondormant male sterile and male fertile maintainer alfalfa germplasms. *Crop Sci.* 29:1095.

Smith, S.E., M. Meiners, N. Putzar and A.K. Dobrenz. 1989. Potential use of measurements of callus and male gametophyte NaCl tolerance in lucerne breeding. *Euphytica* 43:245-251.

Smith, S.E., D.C. Poteet, D.L. Robinson, and A.K. Dobrenz. 1989. Stability of germination salt tolerance in lucerne following seed multiplication at a non-saline site. *Seed Science and Tech.* 17:555-561.

Dobrenz, A.K., D.L. Robinson, S.E. Smith and J.E. Stone. 1988. Registration of AZ-large leaflet nondormant alfalfa germplasm. *Crop Sci.* 28:1934.

Fairbanks, D.J., S.E. Smith and J.K. Brown. 1988. Inheritance of large mitochondrial RNA's in alfalfa. *Theor. and Appl. Genet.* 76:619-622.

Lee, D.J., T.K. Blake and S.E. Smith. 1988. Biparental inheritance of chloroplast DNA and the existence of heteroplasmic cells in alfalfa. *Theor. and Appl. Genet.* 76:545-549.

Smith, S.E. and A.K. Dobrenz. 1987. Seed age and salt tolerance at germination in alfalfa. *Crop Sci.* 27:1053-1056.

Smith, S.E. and R.P. Murphy. 1986. Relationship between inbreeding, meiotic irregularity, and fertility in alfalfa. *Can. J. Genet. Cytol.* 28:130-137.

Smith, S.E., E.T. Bingham, and R.W. Fulton. 1986. Transmission of chlorophyll deficiencies in *Medicago sativa*. Evidence for biparental inheritance of plastids. *J. of Heredity* 77:35-38.

Robinson, D.L., A.K. Dobrenz, and S.E. Smith. 1986. Evaluating the genetic gains for germination salt tolerance in alfalfa using a sodium-chloride gradient. *Agron. J.* 78:1099-1103.

Smith, S.E. 1984. Use of meiotic analysis to determine genomic affinities in *Medicago*. *Can. J. Genet. Cytol.* 26:679-681.

Smith, S.E., R.P. Murphy, and D.R. Viands. 1984. Reproductive characteristics of hexaploid alfalfa derived from 3x X 6x crosses. *Crop. Sci.* 24:169-172.