

CURRICULUM VITAE

NAME: Charles Anthony Sanchez

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EDUCATION

B.S. Crop Science; New Mexico State University; 1980
M.S. Agronomy; New Mexico State University; 1982
Ph.D. Soil Fertility and Chemistry; Iowa State University; 1986

EMPLOYMENT RECORD

Present Director, Research Scientist, and Professor, Yuma Agricultural Center, University of Arizona.

1991-1996 Associate Research Scientist, Department of Soil, Water, and Environmental Science and Yuma Agricultural Research Center (YAC), University of Arizona

1991 Associate Professor, Department of Vegetable Crops and Everglades Research and Education Center (EREC). University of Florida, IFAS

1986-1991 Assistant Professor, Department of Vegetable Crops and Everglades Research and Education Center (EREC). University of Florida, IFAS

1982-1986 Research Associate, Iowa State University

1980-1982 Graduate Assistant, New Mexico State University

CURRENT EMPLOYMENT RESPONSIBILITIES:

DIRECTOR-YUMA AGRICULTURAL CENTERS

Director has responsibility for general operation of the Yuma Agricultural Centers (YAC). Director is responsible for assigning available resources, budget management, maintenance of facilities, supervision of personnel, promotion and development of research and extension programs of the Centers, and conducting a limited research program in his area of expertise. The Director will work with other College of Agriculture faculty, cooperating affiliated scientists, and industry representatives in support of the mission and needs of the agricultural industry and consumers of the state.

RESEARCH SCIENTIST / PROFESSOR -SOIL-PLANT-WATER RELATIONS

Develop and conduct an applied research program to solve problems of commercial growers in the low desert region of the southwestern United States. Also develop and conduct extension support program to complement research program. Research may include plant nutrient utilization, soil and water management, salinity, and fate and transport of agriculturally derived chemicals and environmental toxins. This program should complement other research activities at the University and also be responsive to the needs of commodity groups, associated governmental agencies, and commercial and industrial interests. Cooperative research and outreach programs should be coordinated with research and extension faculty in the lower Colorado River area including California's Imperial and Coachella Valleys.

AWARDS AND HONORS:

Distinguished Service Award, The Yuma Fresh Vegetable Association (2004)
Best Paper Award-Florida State Horticultural Society (1990)
Research Excellence Award-Iowa State University (1986)
Premium for Academic Excellence Award - Iowa State University (1982)
Graduation with Honors - New Mexico State University (1980)
Deans Award of Excellence - New Mexico State University (1980)
American Society of Agronomy - Agronomy Student Award, NMSU (1980)
Phi Kappa Phi (1980)

ORGANIZATIONS:

1. American Society of Agronomy
2. Soil Science Society of America
3. American Society for Horticulture Science
4. American Chemical Society

PUBLICATIONS:

Chapters in Books:

Sanchez, C. A., and P. S. Porter. Phosphorus in the organic soils of the Everglades Agricultural Area. In A. B. Bottcher and F. T. Izuno (eds.) Everglades Agricultural Area (EAA), Water, Soil, Crop, and Environmental Management. 1994. University Press of Florida. Gainesville, FL.

Porter, P. S., and C. A. Sanchez. Nitrogen in the organic soils of the Everglades Agricultural Area. In

A. B. Bottcher and F. T. Izuno (eds.) Everglades Agricultural Area (EAA), Water, Soil, Crop, and Environmental Management. 1994. University Press of Florida. Gainesville, FL.

Schueneman, T. J., and C. A. Sanchez. Vegetable production in the Everglades Agricultural Area. In A. B. Bottcher and F. T. Izuno (eds.). Everglades Agricultural Area (EAA), Water, Soil, Crop, and Environmental Management. 1994. University Press of Florida. Gainesville, FL.

Refereed Journal articles

Sanchez, C. A., and A. M. Blackmer. 1987. A method for application of ^{15}N -labeled anhydrous ammonia to small plots. *Soil Sci. Soc. Am. J.* 51:259-261.

Sanchez, C. A., A. M. Blackmer, R. Horton, and D. R. Timmons. 1987. Assessment of errors associated with lateral movement of ^{15}N when studying fertilizer recovery under field conditions. *Soil Sci.* 144:344-351.

Sanchez, C. A., and A. M. Blackmer. 1988. Recovery of anhydrous ammonia derived nitrogen-15 during three years of corn production in Iowa. *Agron. J.* 80:102-108.

Blackmer, A. M., and C. A. Sanchez. 1988. Response of corn to nitrogen-15-labeled anhydrous ammonia with and without nitrapyrin in Iowa. *Agron. J.* 80:95-102.

Foster, R. E., and C. A. Sanchez. 1988. Effect of Liriomyza trifolii (Diptera: Agromyzidae) larval damage on growth, yield, and cosmetic quality of celery in Florida. *J. Econ. Ent.* 81:1721-1725.

Schaffer, B. K. D. Larson, G. H. Snyder, and C. A. Sanchez. 1988. Identifying mineral limitations associated with "Mango Decline" by DRIS. *HortScience* 23:617-619.

Sanchez, C. A., H. W. Burdine, and F. S. Martin. 1989. Yield and quality responses of three sweet corn hybrids to fertilizer phosphorus. *J. Fert. Issues.* 6:12-24.

Sanchez, C. A., R. T. Nagata, and V. L. Guzman. 1989. Response of sweet corn to N source and rate on Histosols. *HortScience* 24:925-927.

Sanchez, C. A., R. Allen, and B. Schaffer. 1989. Growth and yield of crisphead lettuce as affected by shade conditions. *J. Amer. Soc. Hort. Sci.* 114:884-890.

Coale, F. J., and C. A. Sanchez. 1990. Effective distance of nutrient acquisition for sugarcane grown on Everglades Histosols. *Amer. Soc. Sugar Cane Technologist* 10:39-44.

Sanchez, C. A., S. Swanson, and P. S. Porter. 1990. Banding P to improve fertilizer use efficiency of

lettuce. *J. Amer. Soc. Hort. Sci.* 115:581-584.

Sanchez, C. A., and E. A. Hanlon. 1990. Evaluation of selected phosphorus soil test for lettuce on Histosols. *Commun. Soil Sci. Plant Anal.* 21:1199-1215.

Tankou, C. M., B. Schaffer, S. O'Hair, and C. A. Sanchez. 1990. Nitrogen, shading duration, gas exchange and growth of cassava. *HortScience* 25:1293-1296.

Sanchez, C. A., M. Lockhart, and P. S. Porter. 1991. Response of radish to P and K fertilizers on Histosols. *HortScience* 26:30-32.

Marenco, R. J., R. E. Foster, and C. A. Sanchez. 1991. Residual activity of Methomyl and Thiodicarb against fall armyworm in sweet corn in southern Florida. *Florida Entomologist.* 74:69-74.

Alvarez, J., and C. A. Sanchez. 1991. Phosphorus application constraints limit profitability of sweet corn and lettuce production. *HortScience* 26:307-309.

Sanchez, C. A., P. S. Porter, and M. F. Ulloa. 1991. Relative efficiency of broadcast and banded P for sweet corn produced on Histosols. *Soil Sci. Soc. Am. J.* 55:871-875

Sanchez, C. A., G. H. Snyder, and H. W. Burdine. 1991. DRIS evaluation of the nutritional status of crisphead lettuce. *HortScience* 26:274-276.

Sanchez, C. A., H. Y. Ozaki, K. Schuler, and M. Lockhart. 1991. Nitrogen fertilization of radishes on Histosols: Response and ¹⁵N recovery. *HortScience* 26:865-867.

Izuno, F. T., C. A. Sanchez, F. J. Coale, A. B. Bottcher, and D. B. Jones. 1991. Phosphorus concentrations in drainage water in the Everglades Agricultural Area. *J. Environ. Qual.* 20:608-619.

Jansson, R. K., G. L. Liebe, C. A. Sanchez, and S. H. Lecrone. 1991. Effects of nitrogen and foliar biomass on population parameters of cabbage insects. *Entomologia Experimentalis et Applicata* 61:7-16.

Marenco, R. J., R. E. Foster, and C. A. Sanchez. 1992. Sweet corn response to fall armyworm (*Lepidoptera:Noctuidae*) damage during vegetative growth. *J. Econ. Ent.* 85:1285-1992.

Nagata, R. T., C. A. Sanchez, and F. J. Coale. 1992. Crisphead lettuce cultivar response to fertilizer phosphorus. *Amer. Soc. Hort. Sci. J.* 117:721-724.

Larson, K. D., B. Schaffer, F. S. Davies, and C. A. Sanchez. 1992. Flooding, mineral nutrition and gas exchange of mango trees. *Scientia Horticulturae* 52:113-124.

- Porter, P. S, and C. A. Sanchez. 1992. The effect of soil properties on phosphorus sorption by Everglades Histosols. *Soil Sci.* 154:387-398.
- Coale, F.S., C.A. Sanchez, F.T. Izuno, and A.B. Botcher. 1993. Nutrient accumulation and removal by sugarcane on Histosols. *Agron. J.* 82:310-315.
- Espinoza, L., C.A. Sanchez, and T.J. Schueneman. 1993. Celery yields respond to phosphorus rate but not placement on Histosols. *HortScience* 28:1168-1170.
- Rechcigl, J.E., G.G. Payne, and C.A. Sanchez. 1993. Comparison of various soil drying techniques on extractable nutrients. *Commun. Soil Sci. Plant Ana.* 23:2347-2363.
- Rezaian, S., E.A. Hanlon, C.A. Sanchez, and J.A. Cornell. 1993. Optimization of soil:solution ratio and shaking time of the M-III soil test on Histosols. *Commun. Soil Sci. Plant Ana.* 23:2247-2259.
- Shrefler, J. W., J. A. Dusky, D. G. Shilling, B. J. Brecke, and C. A. Sanchez. 1994. Effects of phosphorus fertility on competition between lettuce (*Lactuca sativa*) and spiny amaranth (*Amaranthus spinosus*). *Weed Science* 42:556-560.
- Sanchez, C.A., R.L. Roth, and B.R. Gardner. 1994. Irrigation and nitrogen management for sprinkler irrigated cabbage on sand. *J. Amer. Soc. Hort. Sci.* 119:427-433.
- Roth, R. L., C. A. Sanchez, and B. R. Gardner. 1995. Growth and yield of mature 'Valencia' oranges converted to pressurized irrigation. *Applied Engineering in Agriculture.* 11:101-105.
- Sanchez, C. A., and N. M. El-Hout. 1995. Response of different lettuce types to fertilizer phosphorus. *HortScience.* 30:528-531.
- Palumbo, J., and C. A. Sanchez. 1995. Imidacloprid does not enhance growth and yield of cantaloupe in the absence of whitefly. *HortScience* 30:997-999.
- Capone, L. T., F. T. Izuno, A. B. Bottcher, C. A. Sanchez, F. J. Coale, and D. B. Jones. 1995. Nitrogen concentration in agricultural drainage water in South Florida. *Trans. of ASAE* 38:1089-1098.
- Izuno, F. T., A. B. Bottcher, F. J. Coale, C. A. Sanchez, and D. B. Jones. 1995. Agricultural BMPs for phosphorus reduction in South Florida. *Trans. of ASAE* 38:735-744.
- Alvarez, J., and C. A. Sanchez. 1996. Agro-economic research and environmental regulations: Phosphorus applications in sweet corn and lettuce in the Everglades. *J. Sustain. Agric.* 7:15-24.

Sanchez, C. A., R. L. Roth, B. R. Gardner, and H. Ayer. 1996. Economic responses of broccoli and cauliflower to water and N in the desert. *HortScience* 31:201-205.

Sanchez, C. A., and J. C. Silvertooth. 1996. Managing saline and sodic soils for the production of horticultural crops. *HortTechnology* 6:99-107.

Palumbo, J. C., D. L. Kerns, C. E. Engle, C. A. Sanchez, M. Wilcox. 1996. Imidacloprid formulations and soil placement effects on colonization by sweetpotato whitefly (Homoptera: Aleyrodidae): Head size and incidence of chlorosis in lettuce. *J. Econ. Ent.* 89:735-742.

Sanchez, C. A., and T. A. Doerge. 1999. Using nutrient uptake patterns to develop efficient nitrogen management strategies for vegetables. *HortTechnology* 9:601-606.

Sanchez, CA. 2000. Response of lettuce to water and N on sand and the potential for leaching of nitrate-N. *HortScience* 35:73-77.

Zerihun, D., C. A. Sanchez, and K. Farrell-Poe. 2001. Analysis and Design of Furrow Irrigation Systems. *J. Irrigation Drainage Eng.*, ASCE. 127:161-169.

Silvertooth, J. C., J. Navarro, E. R. Norton, and C. A. Sanchez. 2001. Evaluation of a nitrogen-15 microplot design in a furrow irrigated row crop system. *Soil Sci. Soc. Am. J.* 65:247-249.

Rice, R.W., L.E. Datnoff, R.N. Raid, and C.A. Sanchez. 2002. Influence of vesicular-arbuscular mycorrhizae on celery transplant growth and phosphorus-use efficiency. *J. Plant Nutrition.* 25(8):1839-1853.

Zerihun, D., C. A. Sanchez, and K. Farrell-Poe, F. J. Adamsen, and D. J. Hunsaker. 2003. Performance indices for surface N-fertigation. *J. Irrigation Drainage Eng.*, ASCE. 129:173-183.

Moore, R.C., K.H Holt, H. Zhao, A. Hasan, N. Awwad, M Gasser, and C. Sanchez. 2003. Sorption of Np (V) by synthetic hydroxyapatite. *Radiochimica Acta* 91: 721-727.

Moore, R. C., C. A. Sanchez, K. Holt, P. Zhang, H. Xu, and G. R. Choppin. 2004. Formation of Hydroxyapatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. *Radiochimica Acta* 92:719-723.

Moore,R.C., M. Gasser, N. Awwad, K.C. Holt, F.M. Salas, A. Hasan, M.A. Hasan, H.Zhao and C.A. Sanchez. 2005. Sorption of Plutonium (VI) by Hydroxyapatite. *J of Radioanalytical and Nuclear Chemistry* 262:97-101

Zerihun,D.,A. Furman, A.W. Warrick, and C.A. Sanchez. 2005. A coupled surface-subsurface model for improved basin irrigation management. *J of Irrigation Drainage ASCE* 131 (2) :111-128.

Warrick, A. W. D. Zerihun, C.A. Sanchez and A. Furman. 2005. Infiltration under variable ponding depths of water. *J of Irrigation Drainage Eng.* ASCE 131 (4):358-363.

Sanchez, C. A., R. I. Krieger, N. Khandaker, R. C. Moore, K. Holts and L. L. Neidel. 2005. Accumulation and perchlorate exposure potential of lettuce produced in the lower Colorado River region. *J. Agric. Food Chem.* .53:5479-5486.

Zerihun,D.,A. Furman, A.W. Warrick, and C.A. Sanchez. 2005. A coupled surface-subsurface solute transport model for irrigation borders and basins I. Model development. *J of Irrigation Drainage Eng.* ASCE 131 (5) 396-406.

Zerihun,D.,C. A. Sanchez, A. Furman, and A.W. Warrick. 2005. A coupled surface-subsurface solute transport model for irrigation borders and basins II. Model evaluation. *J of Irrigation Drainage Eng.* ASCE 131 (5) 407-419.

Zerihun, D., C. A. Sanchez, and K. Farrell-Poe. 2005. Analysis and design of border irrigation System. *Transactions ASAE* 48 (in press).

Sanchez, C. A., K. S. Crump, R. I. Krieger, N. R. Khandaker, and J. P. Gibbs. 2005. Perchlorate and nitrate in leafy vegetables of North America. *Env. Sci. Tech.* (in press)

Furman, A., A. W. Warrick, D. Zerihun, and C. A. Sanchez. Modified Kostiakov infiltration function: accounting for initial and boundary conditions. Submitted to *J. of Irrigation Drainage Eng.* ASCE (in review)

Regional Journal publications

Sanchez, C. A., and H. W. Burdine. 1988. Relationship between soil test P and K levels and lettuce yield on Everglades Histosols. *Soil Crop Sci. Soc. Fla. Proc.* 47:52-56.

Sanchez, C. A., H. W. Burdine, V. L. Guzman, and C. B. Hall. 1989. Yield, quality, and leaf nutrient composition of crisphead lettuce as affected by N, P, and K fertilizers on Histosols. *Proc. Fla. State Hort. Soc.* 101:346-350.

Sanchez, C. A., and H. W. Burdine. 1989. Soil testing and plant analysis as guides for the fertilization of escarole and endive on Histosols. *Soil Crop Sci. Soc. Fla.* 48:37-40.

Guzman, V. L., C. A. Sanchez, and R. T. Nagata. 1989. A comparison of transplanted and direct-seeded lettuce at various levels of soil fertility. *Soil Crop Sci. Soc. Fla.* 48:26-28.

Snyder, G. H., C. A. Sanchez, and J. S. Alrichs. 1989. DRIS evaluation of the nutrient status of Bahia and St. Augustine Turfgrass. 1990. Proc. Fla. State Hort. Soc. 102:133-137.

Sanchez, C. A., H. W. Burdine, V. L. Guzman, and R. B. Beverly. 1989. Management of high pH Histosols for lettuce production. Proc. Fla. State Hort. Soc. 102:341-343.

Lockhart, J. M., and C. A. Sanchez. 1990. Acidification of an Everglades Histosols using several fertilizer sources. Proc. Fla. State Hort. Soc. 102:344-345.

Sanchez, C. A., H. W. Burdine, and V. L. Guzman. 1990. Soil testing and plant analysis as guides for the fertilization of celery on Histosols. Soil Crop Sci. Soc. Fla. Proc. 49: 69-72.

Snyder, G. H., and C. A. Sanchez. 1990. Aquatic crops of economic value for removing N and P from Nutrient-Enriched water in the Everglades. Soil Crop Sci. Soc. Fla. Proc. 49:53.

Bulletins

McCaslin, B. D., B. A. Milton, C. A. Sanchez, H. A. Marong, and J. G. Davis. 1986. Effect of phosphorus fertilization on alfalfa yield and tissue P concentration. New Mexico State University Agricultural Experiment Station Exp. Stn. Bulletin 721.

Sanchez, C. A. 1989. Soil testing and fertilizer recommendations for crop production on organic soils in Florida. Univ. of Florida (Technical) Bulletin 876.

Grants Received over Past Five Years

United States Bureau of Reclamation. Design and installation of water measurement structures for the Yuma Mesa Irrigation District. Sanchez **\$22,225.0**. 2005-2006

United States Bureau of Reclamation. Bilingual outreach for efficient irrigation on the Yuma Mesa Irrigation District. Sanchez **\$18,661.0** 2005-2006

Arizona Iceberg Lettuce Research Council. Survey and exposure estimates of cadmium in desert lettuce. Sanchez and Krieger. **\$12,500.0**. 2005-2006

USDA-NIFSP. Assessment of perchlorate content and risks of food crops irrigated with Colorado River water. Sanchez, Krieger, and Van Baale. **\$414,344.0**. 2004-2007

USGS. Preliminary evaluation of perchlorate contamination of groundwater in the lower Colorado River region. Sanchez. **\$11,945.0**

Cactus and Pine Foundation. Evaluation of soil salinity on selected Arizona golf courses using electromagnetic induction. Brown and **Sanchez** **\$62,050.0**. 2004-2005.

California Citrus Research Board. Perchlorate survey and risk assessment for citrus irrigated with perchlorate contaminated water. Krieger and **Sanchez**. **\$26,100.0**. 2004-2005

Kerr McGee Corp. Survey of leafy vegetables produced in North America for perchlorate. **Sanchez** **\$74,666.0**. 2004

USDA-ARS Salinity Laboratory Cooperative Agreement. Water table management and field response of lettuce to salinity. **Sanchez** . **\$66,000.0**. 2004-2005.

California Lettuce Research Board. Survey and preliminary risk assessment of perchlorate for lettuce irrigated with Colorado River water. Krieger and **Sanchez**. **\$29,000.0**. 2003-2004

Arizona Iceberg Lettuce Research Council. Preliminary evaluation of factors affecting perchlorate, uptake, accumulation, and redistribution in lettuce. **Sanchez** **\$19,000.0**. 2003-2004.

Arizona Citrus Research Council. Response of lemon to micronutrient fertilization. **Sanchez** and Wright. **\$26,741.0**. 2004-2005

USDA-ARS. Pesticide Risk Assessment Office Cooperative Agreement. Perchlorate residues on agricultural produce irrigated by water from the Colorado River. **Sanchez**. **\$40,000**. 2003-2004

United States Bureau of Reclamation. Irrigation management guidelines for the Yuma Valley. **Sanchez** and Zerihun. **\$50,506.0** 2003-2004.

United States Bureau of Reclamation. Demonstration and application of GPS referenced electromagnetic induction (EM38) salinity assessment in the Wellton-Mohawk Irrigation and Drainage District. **Sanchez**. **\$19,936.0**. 2002-2004

United States Bureau of Reclamation. Implementation and evaluation of improved irrigation management practices in the Yuma Mesa Irrigation District. **Sanchez** and Zerihun. **\$55,170.6**. 2001-2004.

USDA-NRI. Optimization of water and N for surface irrigated production systems. **Sanchez**, Zerihun, Warrick, and Bali. **\$227,000.0**. 2000-2003.

USDA-Specialty Crop Block Grants. Proposed upgrades for enhanced lettuce and other vegetable crop research at the University of Arizona's Yuma Agricultural Center. **Sanchez** **\$129,500.0**. 2002-2003.

Arizona Iceberg Lettuce Research Council. Survey of lettuce for potential perchlorate accumulation. **Sanchez** **\$16,150.0**. 2002-2003

USDA CSREES-PMAP. Cultural and chemical alternatives for thrip management in leafy vegetables. Palumbo and **Sanchez** **\$122,217.0**. 2001-2003.

State of California Fertilizer Research and Education Program. Efficient irrigation for reduced non-point source pollution from vegetable production. **Sanchez** and Bali. **\$89,922.0**. 1999-2002.

State of California Fertilizer Research and Education Program. Development and demonstration of N best management practices for sweet corn. Aguiar, Mayberry, **Sanchez**, and Cantwell. **\$90,990.0**. 1999-2002.

Foundation for Agronomic Research and the Potash and Phosphate Institute. Response of citrus to K fertilizer on a sandy soil. **Sanchez** and Wright. **\$35,000.0**. 1997-2002.

Arizona Citrus Research Council. Evaluation of N fertilization practices for surface irrigated lemons. **Sanchez** **\$28,219.0**. 2001-2002.

USDA-SARE. Cropping systems for intensive vegetable production. McGiffen, **Sanchez**, Palumbo¹, Matheron¹, Toscano, Tickes, Aguiar, Mitchell. **\$130,672.0**. 1998-2001.

United States Bureau of Reclamation. Salinity assessment and management in the lower Colorado River region with particular reference to irrigation and drainage. **Sanchez** **\$67,443.0** 1998-2002.

United States Bureau of Reclamation. Evaluation of methodology for estimating irrigation time as influenced by soil texture and spatial and temporal variability. **Sanchez** and Bali **\$96,107.0**. 1998-2000.