STEVEN RICHARD SIMS, PhD

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SUMMARY

Innovative entomologist with more than thirty years of experience managing the discovery, research, and development of genetically engineered crop plants and conventional pesticide products. Specific experience and skills in the following areas:

- Project management
- New product discovery
- Technology assessment
- GLP studies
- Experimental design
- Data analysis
- Resistance management
- Toxicology
- Patent development
- Communication (oral & written)
- Insect behavior
- Formulations
- Lab and field research
- Natural products
- Insect baits

EDUCATION

Ph.D., University of California, Davis, California, March 1978 (Entomology).
B.S., University of California, Davis, California, June 1971 (Entomology).

AWARDS AND HONORS

1. Graduated with Honors (Entomology), June 1971, University of California, Davis.
2. UCD Graduate Fellowship for 1973-4, University of California, Davis.
3. E. J. Wickson Memorial Scholar in Entomology for 1974-5, University of California, Davis.
4. Agriculture Fellowship for 1975-6, University of California, Davis.
5. H. A. Jastro Research Grant, 1975-6 and Scholar, 1976-7, University of California, Davis.
6. Elected Associate Member of Sigma Xi, May 1975.
7. Intercampus Research Grant Recipient, 1973-4 and 1974-5, University of California, Davis.
8. Elected full member of Sigma Xi, April 1979.
9. World Technical Excellence Award, Monsanto, 1992.
10. Achievement Award, Monsanto, 1995.
11. Innovation Award, BASF, 2011
12. Affiliate Professor of Entomology, Auburn University, Auburn, Alabama. January 2013.
13. NCB-Entomological Society of America Recognition Award in Urban Entomology, June 2013

PROFESSIONAL EXPERIENCE

1. CONSULTANT, ENTOMOLOGY PRODUCT RESEARCH AND DEVELOPMENT: July 2012 to present.
Blue Imago Consulting, LLC, St. Louis, MO

2. PRINCIPAL RESEARCH SCIENTIST. ENTOMOLOGY AND MANAGER OF PRODUCT DEVELOPMENT: September 1996 to July 2012. Whitmire Micro-Gen and BASF Corporation, St. Louis, MO.

- Discovered and evaluated new technology for professional pest control including novel active ingredients (natural products and conventional pesticide chemistry), aerosol, concentrate, and bait formulations
- Managed projects, product development, and registration of insect control formulations (including aerosols, concentrates, baits, attractants, etc.) and novel delivery systems
- Provided entomology expertise and guidance for the business and served as lead contact for University cooperators.

3. SENIOR RESEARCH ENTOMOLOGIST: Jan. 1989 to Sept. 1996. Monsanto, St. Louis, MO. Experience in:

- Testing, development and registration of microbial and biological insecticides, including entomopathogenic nematodes, bacteria, etc. and transgenic insect resistant plants
- Primary and advanced evaluation of experimental chemistry and licensed compounds for insecticidal efficacy
- Analysis of new business, product and research opportunities for insect control including the Lawn & Garden, Industrial & Residential and Agricultural areas
- Assay development. Development and implementation of novel bioassays for discovery of new organic compounds and proteins with insecticidal activity
- Resistance management. Research on strategy and tactics to delay the development of insect resistance to genetically modified plants
- Registration of plants producing insecticidal proteins. Established and supervised a GLP research laboratory. Responsible for all entomological aspects of research and documentation necessary for EPA registration of insect resistant plant products, including cotton, potato and corn
- Supervised contract agency employees

4. RESEARCH ENTOMOLOGIST: Feb. 1985 to Jan. 1989. Monsanto, St. Louis, MO.

- Supervised insect rearing facility (>10 species)
- Developed novel bioassays to determine chemical mode of action and pathology of insecticides and acaricides
- Evaluated bioengineered and natural *Bacillus thuringiensis* (Bt) and the potential for target species resistance

5. RESEARCH SCIENTIST: Dec. 1982 to Jan. 1985. University of Florida, TREC-Homestead, FL. Conducted studies on biology of the fall armyworm, *Spodoptera frugiperda*, in Florida. Research included characterization of overwintering areas, host plants, and mortality factors influencing population levels. Trained and supervised two technicians and operated on a USDA-funded budget.

6. RESEARCH ASSOCIATE: November 1980 to November 1982. North Carolina State University, Raleigh, NC. Research on the physiological and behavioral responses of the bean leaf beetle, *Cerotoma trifurcata*, to variation in food and physical factors and a study on spatial and temporal variation in population quality.

7. RESEARCH ASSOCIATE: October 1978 to October 1980. University of Notre Dame, South Bend, IN. Research on the genetic basis of egg and larval diapause in *Aedes triseriatus* mosquitoes and determination of environmental induction and termination of these dormancy traits and their adaptive value.

8. LECTURER IN ENTOMOLOGY: Winter quarter 1978. University of California, Davis. Instructor for Insect Ecology. Prepared and presented 3 lectures/week, managed teaching assistants, prepared and graded examinations.

SOCIETY MEMBERSHIPS

Entomological Society of America
Lepidopterists Society
Phi Chi Omega

PUBLICATIONS

(1) Brittnacher, J. G., S. R. Sims, and F. J. Ayala. 1978. Genetic differentiation between species of the genus *Speyeria* (Lepidoptera: Nymphalidae). Evolution 32:199-210.

(2) Sims, S. R. 1978. A red-eyed mutant of *Papilio zelicaon* (Lepidoptera: Papilionidae). Ann. Entomol. Soc. Amer. 71:771-772.

(3) Sims, S. R., J. G. Brittnacher, and F. J. Ayala. 1979. Genetic confirmation of the specific status of *Speyeria adiaste* (Lepidoptera: Nymphalidae). Pan. Pac.Entomol. 55:111-116.

(4) Sims, S. R. 1979. Aspects of mating frequency and reproductive biology of *Papilio zelicaon* (Lepidoptera: Papilionidae). Amer. Midl. Nat. 103:36-50.

(5) Sims, S. R. 1980. Diapause dynamics and host-plant suitability of *Papilio zelicaon* (Lepidoptera: Papilionidae). Amer. Midl. Nat. 103:375-384.

(6) Sims, S. R. 1982. Larval diapause variation in a tree-hole mosquito. Bioscience 32:337-338.

(7) Sims, S. R. 1982. Larval diapause in the eastern tree-hole mosquito, *Aedes triseriatus*: Latitudinal variation in induction and intensity. Ann. Entomol. Soc. Amer. 75:195-200.

(8) Sims, S. R. 1983. The genetic and environmental basis of pupal colour dimorphism in *Papilio zelicaon* (Lepidoptera: Papilionidae). Heredity 50:159-168.

(9) Sims, S. R. and L. E. Munstermann. 1983. Egg and larval diapause in two populations of *Aedes geniculatus* (Diptera: Culicidae). J. Med. Entomol. 20:263-271.

(10) Sims, S. R. and A. M. Shapiro. 1983. Pupal diapause in *Battus philenor* (L.) (Lepidoptera: Papilionidae). Ann. Entomol. Soc. Amer. 76:407-412.

(11) Sims, S. R. and A. M. Shapiro. 1983. Pupal colour dimorphism in California *Battus philenor*: Pupation sites, environmental control, and diapause linkage. Ecol. Entomol. 8:95-104.

(12) Sims, S. R. 1983. Inheritance of diapause induction and intensity in *Papilio zelicaon* (Lepidoptera: Papilionidae). Heredity 51:494-500.

(13) Sims, S. R. 1983. Prolonged diapause and pupal survival of *Papilio zelicaon* Lucas (Lepidoptera: Papilionidae). J. Lepid. Soc. 37:29-37.

(14) Sims, S. R. and A. M. Shapiro. 1983. Seasonal phenology of *Battus philenor* (L.) (Papilionidae) in California. J. Lep. Soc. 37:281-288.

(15) Sims, S. R. and A. M. Shapiro. 1983. Pupal color dimorphism in California *Battus philenor* (L.) (Papilionidae): Mortality factors and selective advantage. J. Lepid. Soc. 37:236-243.

(16) Sims, S. R., P. G. Marrone, F. Gould, R. E. Stinner, and R. L. Rabb. 1984. Ecological determinants of bean leaf beetle size variation in North Carolina (Coleoptera: Chrysomelidae). Environ. Entomol. 13:300-304.

(17) Sims, S. R. 1984. Reproductive diapause in *Speyeria* (Lepidoptera: Nymphalidae). J. Res. Lepid. 23:211-216.

(18) Sims, S. R. 1985. Embryonic and larval diapause in *Aedes triseriatus* (Diptera: Culicidae): Phenotypic correlation and ecological consequences of the induction response. pp. 359-369. In Mosquito Ecology Workshop. Ed.Lounibos, L. P., J. H. Frank, and J. R. Rey. Fl. Med. Entomol Lab.

(19) Pair, S. D., J. R. Raulston, A. N. Sparks, S. R. Sims, R. K. Sprenkel, G. K. Douce, and J. E. Carpenter. 1989. Pheromone traps for monitoring fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), populations. J. Entomol. Sci. 24:34-39.

(20) Stone, T. B., S. R. Sims, and P. G. Marrone. 1989. Selection of tobacco budworm for resistance to a genetically engineered *Pseudomonas fluorescens* containing the delta endotoxin of *Bacillus thuringiensis* subsp. *kurstaki*. J. Invert. Path. 53:228-234.

(21) MacIntosh, S. C., G. M. Kishore, F. J. Perlak, P. G. Marrone, T. B. Stone, S. R. Sims, and R. L. Fuchs. 1990. Potentiation of *Bacillus thuringiensis* activity by serine protease inhibitors. J. Agric. Food Chem. 38:1145-1152.

(22) Delannay, X., B. J. LaVallee, R. K. Proksch, R. L. Fuchs, S. R. Sims, J. T. Greenplate, P. G. Marrone, R. B. Dodson, J.J. Augustine, J. G. Layton, and D. A. Fischhoff. 1990. Field performance of transgenic tomato plants expressing the *Bacillus thuringiensis* var. *kurstaki* insect control protein. Bio/Technology 7:1265-1270.

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(28) Stone, T. B. and S. R. Sims. 1992. Insect rearing and the development of bioengineered crops. In Advances in Insect Rearing, Eds. T. E. Anderson and N. C. Leppla, Westview Press, Boulder, Colo. pp. 33-40.

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(36) Lavrik, P. B., D. E. Bartnicki, J. Feldman, B. G. Hammond, P. J. Keck, S. L. Love, M. W. Naylor, G. J. Rogan, S. R. Sims, and R. L. Fuchs. 1995. Safety assessment of potatoes resistant to Colorado potato beetle. In Genetically Modified Foods, Safety Issues. Eds. K-H. Engel, G. R. Takeoka, and R. Teranishi. American Chemical Society, Wash. DC pp. 148-158.

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(39) Sims, S. R. and L. R. Holden. 1996. Insect bioassay for determining soil degradation of *Bacillus thuringiensis* var. *kurstaki* [CryIA(b)] protein in corn tissue. Environ. Entomol. 25:659-664.

(40) Sims, S. R., J. C. Pershing, and B. J. Reich. 1996. Field evaluation of transgenic corn containing a *Bacillus thuringiensis* insecticidal protein gene against *Helicoverpa zea* (Lepidoptera: Noctuidae). J. Entomol. Sci. 31:340-346.

(41) Sims, S. R., S. A. Berberich, D. L. Nida, L. A. Segalini, J. N. Leach, C. C. Ebert, and R. L. Fuchs. 1996. Analysis of expressed proteins in fiber fractions from insect-protected and glyphosate-tolerant cotton varieties. Crop Sci. 36:1212-1216.

(42) Sims, S. R., J. T. Greenplate, T. B. Stone, M. A. Caprio, and F. L. Gould. 1996. Monitoring strategies for early detection of Lepidoptera resistance to *Bacillus thuringiensis* insecticidal proteins, pp. 229-242, *In* Molecular Genetics and Evolution of Pesticide Resistance, T. M. Brown, Ed., American Chemical Society Symposium Series Number 645.

(43) Gustafson, M. E., R. A. Clayton, P. B. Lavrik, G. V. Johnson, R. M. Leimgruber, S. R. Sims, and D. E. Bartnicki. 1997. Large scale production and characterization of *Bacillus thuringiensis* subsp. *tenebrionis* insecticidal protein from *Escherichia coli*. Applied Microbiology and Biotechnology. 47(3):255-261.

(44) Sims, S. R. and J. W. Martin. 1997. Effect of the *Bacillus thuringiensis* insecticidal proteins CryIA(b), CryIA(c), CryIIA, and CryIIIA on *Folsomia candida* and *Xenylla grisea* (Insecta: Collembola). Pedobiologia 41:412-416.

(45) Sims, S. R. and J. E. Ream. 1997. Soil inactivation of the *Bacillus thuringiensis* subsp. *kurstaki* CryIIA insecticidal protein within transgenic cotton tissue: Laboratory microcosm and field studies. J. Agric. Food Chem. 45:1502-1505.

(46) Sims, S. R. 1997. Host activity spectrum of the CryIIa *Bacillus thuringiensis* subsp.*kurstaki* protein: Effects on Lepidoptera, Diptera, and non-target arthropods. Southwestern Entomologist 22:395-404.

(47) Sims, S. R. 1998. A freeze-thaw stable Lepidoptera diet. J. Agric. Entomol. 15:39-42.

(48) Sims, S. R. 2000. Bioassays of Genetically Engineered *Bacillus thuringiensis* Plant Products, pp.25-40, *In* Bioassays of Entomopathogenic Microbes and Nematodes, A. Navon and K. R. S. Ascher, Eds., Chapman and Hall.

(49) Caprio, M. A., D. V. Summerford, and S. R. Sims. 2000. Evaluating Transgenic Plants For Suitability in Pest and Resistance Management Programs pp.805-828, *In* Field Manual of Techniques in Invertebrate Pathology, L.A. Lacey and H. K. Kaya, eds., Kluwer Academic Publishers, Netherlands.

(50) Appel, A. G., Eva, M. J., and S. R. Sims. 2005. Toxicity of granular ant bait formulations against cockroaches [Dictyoptera: Blattellidae and Blattidae]. Sociobiology 46: 65-72.

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(53) Sims, S. R. 2006. Seasonal variation in feeding preferences of *Tetramorium tsushimae* (Hymenoptera, Formicidae) in St. Louis, Missouri. Sociobiology 48 (2): 409-416.

(54) Sims, S. R. and D. R. Suiter. 2006. Uncooperative ants. Pest Control Technology, 34(8): 96-101.

(55) Sims, S. R. 2006. Development of commercial ant baits. Proceedings Natl. Conf. Urban Entomol., Raleigh-Durham, North Carolina, May 21-24, 2006. pp. 153-155.

(56) Sims, S. R. 2007. Diapause dynamics, seasonal phenology, and pupal color dimorphism of *Papilio polyxenes* in southern Florida, USA. Entomologia Experimentalis et Applicata 123: 239-245.

(57) Sims, S. R. and A. G. Appel. 2007. Linear alcohol ethoxylates: Insecticidal and synergistic effects on German cockroaches (Blattodea: Blattellidae) and other insects. J. Econ. Entomol. 100(3): 871-879.

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(59) Sims, S. R. 2008. Exempt products for the professional pest control market: fads or the future? Proceedings Natl. Conf. Urban Entomol., Tulsa, OK, May 18-21, 2008. pp. 27-28.

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(61) Sims, S. R. 2008. Influence of soil type and rainfall on pupal survival and adult emergence of the fall armyworm (Lepidoptera: Noctuidae) in Southern Florida. J. Entomol. Science. 43: 373-380.

(62) Sims, S. R., Suiter, D. R. and L. M. Ames. 2008. Insect Identification for the PCO: Nuisance or Necessity? Pest Control Technology. Vol 36 (12): 61-64.

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PATENTS

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Cink, J. H., Sims, S. R., Berger, J. D., White, L. M., Martin, J. A. and Moran, H. W. 2006. Pest control device and method. US 7,086,196 B2. Aug. 8, 2006.

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Sims, S. R. 2009. Pesticide compositions. APN 10-15-09 20090258889/US-A1 NDN- 041-0948-8351-3

Sims, S. R. 2009. Pesticide compositions. APN 10-15-09 20090257958/US-A1 NDN- 041-0948-4953-0

Sims. S. R. and D. H. Naffziger. 2011. Bait compositions useful for the control of silverfish. Pat Appl. 27843-523

REFERENCES

Arnason, John T., Dept. of Biology, University of Ottawa, Ottawa, Ontario, Canada. 613-562-5262

Appel, Arthur G., Dept. Entomology and Plant Pathology, Auburn University, Auburn Alabama. 334-844-5006

Naffziger, David H., BASF Corp., 3568 Tree Court Industrial Blvd., St. Louis, MO. 63122. 314-422-8467