

Personal Information on Departmental Web Page

Name: Mark A. Bennett

Areas of Responsibility (55% R; 30%T; 15% E) and Interests:

- (1) Seed Quality and Seedling Establishment of Vegetable Crops
- (2) Seed Biology

Education History:

Graduate Ph.D. Horticulture, 1985, University of Minnesota, St. Paul, MN.

M.S. Horticulture, 1982, University of Minnesota, St. Paul, MN.

Undergraduate B.A. Biology, 1977, St. Olaf College, Northfield, MN.

Position Held: Professor

Current Activities -----

Research Projects:

Seed quality and seedling establishment of vegetable crops. Studies concentrate on vegetable seed development and production, seed enhancement procedures, and plug production of vegetable transplants.

Integrated Crop Management Programs. Studies center on reducing chemical applications while maintaining acceptable quality and yield of vegetable crops.

Courses Taught:

HCS 294 (Organic Gardening) w/ E. Grassbaugh annually since 2007

HCS 310 (Control of Horticultural Plant Development) annually since 1994. Ohio State University, Columbus.

HCS 450 (Vegetable Crop Production) 1995 and alternate years. Ohio State University, Columbus.

HCS 605 (Advanced Vegetable Crop Production & Physiology) 1996, and alternate years. Ohio State University.

HCS 630 (Seed Production) w/MBMcDonald - 1999 and alternate years. Ohio State University

HCS 631 (Seed Physiology) w/MBMcDonald - 2008 and alternate years. Ohio State University

5-year Referred Publications:

Hoffmaster, A.L., K. Fujimura, M.B. McDonald and M.A. Bennett. 2003. An automated system for vigor testing three-day-old soybean seedlings. *Seed Science and Technol.* 31:701-713.

Caseiro, R., M. Bennett and J. Marcos Filho. 2004. Comparison of three priming techniques for onion seed lots differing in initial seed quality. *Seed Sci. and Technol.* 32:365-375.

Ramirez-Rosales, G., M.A. Bennett, M.B. McDonald and D. Francis. 2004. Effect of fruit development on the germination and vigor of high lycopene tomato (Lycopersicon esculentum Mill.). Seed Sci and Technol. 32:847-855.

Bennett, M.A., E.M. Grassbaugh, A.F. Evans and M.D. Kleinhenz. 2004. Saturated salt accelerated aging (SSAA) and other vigor tests for vegetable seeds. Seed Technol. 26:67-74.

Pasian, C.C. and M.A. Bennett. 2004. Paclobutrazol soaked ornamental kale seeds produce short seedlings. Plant Growth Regulation Qtrly. 32:87-91.

Ramirez-Rosales, G., M.A. Bennett, M.B. McDonald and D. Francis. 2005. Total antioxidant capacity of fruit and seeds from normal and enhanced lycopene tomato (Lycopersicon esculentum Mill.) genotypes. Seed Technol. 27:66-75.

Li, W., M.B. McDonald, M.A. Bennett, and F.Y. Kwong. 2005. Hydropriming of differing size classes of impatiens 'ExpoWine' seeds. Seed Sci. and Technol. 33:639-646.

Ramirez-Rosales, G., M.A. Bennett, M.B. McDonald and D.M. Francis. 2005. Gibberellin plus norflurazon enhance the germination of a dark green tomato genotype. Seed Technology 27:59-65.

Penaloza, P., G. Ramirez Rosales, M. McDonald, and M. Bennett. 2005. Lettuce (Lactuca sativa L.) seed quality evaluation using physical attributes, saturated salt accelerated aging and the seed vigor imaging system. Electronic J. Biotechnol. Res/240.

Daoust, T., K. Fujimura, M.B. McDonald and M.A. Bennett. 2005. Improving automated systems for seed measurement and purity analysis. Seed Technol. 27:243-247.

Hoffmaster, A.F., L. Xu, K. Fujimura, M.B. McDonald, M.A. Bennett and A.F. Evans. 2005. The OSU seed vigor imaging system (SVIS) for soybean and corn seedlings. Seed Technol. 24:165-168

Magnitskiy, S.V., C.C. Pasian, D.W. Burger, M.A. Bennett and J.D. Metzger. 2005. Viability, metabolic heat and respiration rates of paclobutrazol treated verbena and marigold seeds. Seed Technol. 27:223-229.

Daoust, T., K. Fujimura, M.B. McDonald and M.A. Bennett. 2005. A computer-based system for seed identification. Seed Technol. 27:190-202.

Marcos-Filho, J., M.A. Bennett, M.B. McDonald, A.F. Evans, and E.M. Grassbaugh. 2006. Assessment of melon seed vigour by an automated computer imaging system compared to traditional procedures. Seed Science and Technol. 34:485-497.

Magnitskiy, S.V., C.C. Pasian, M.A. Bennett and J.D. Metzger. 2006. Controlling plug height of verbena, celosia and pansy by treating seeds with paclobutrazol. HortScience 41:158-161.

Magnitskiy, S.V., C.C. Pasian, M.A. Bennett and J.D. Metzger. 2006. Effects of soaking cucumber and tomato seeds in paclobutrazol solutions on fruit weight, fruit size, and paclobutrazol level in fruits. *HortScience* 41:1446-1448.

Magnitskiy, S.V., C.C. Pasian, M.A. Bennett and J.D. Metzger. 2006. Controlling height and seedling emergence of french marigold and celosia plugs with plant growth regulators. *J. Environ. Hort* 24:165-168.

Derksen, R.C., S. Vitanza, C. Welty, S. Miller, M. Bennett and H. Zhu. 2007. Field evaluation of application variables and plant spacing for bell pepper pest management. *Trans. ASAE* 1945-1953.

Contreras, S., M.A. Bennett and D. Tay. 2008. Restricted water availability during lettuce seed production decreases seed yield per plant but increases seed size and water productivity. *HortScience* 43:xx-xx (accepted).

Mtui, H.D., M.A. Bennett, A.P. Maerere, M.D. Kleinhenz and S.A. Miller. 2008. Effect of seed treatments and mulch on seedborne bacterial pathogens and yield of tomato (*Lycopersicon esculentum* Mill.). *Asian J. Plt. Sciences* 7:xx-xx (in prep.)

Contreras, S., M.A. Bennett, D. Tay and J. Metzger. 2008. Maternal light environment during seed development affects lettuce seed weight, germinability and storability. *HortScience* 43:xx-xx (accepted).

Contreras, S., R. Rabara, M.A. Bennett, D. Tay and M.B. McDonald. 2008. Acquisition of germination capacity, photodormancy and desiccation tolerance in lettuce seeds. *Seed Sci. and Technol* 36:xx-xx (accepted).

Wyenandt, C.A., L.H. Rhodes, M.A. Bennett and R.M. Riedel. 2008. Cover crop mulch and fungicide program affect development of septoria leaf spot and marketable yield in processing tomato production. *HortScience* 43:xx-xx (accepted).

Wyenandt, C.A., L.H. Rhodes, R.M. Riedel, S.G.P. Nameth, and M.A. Bennett. 2008. Cover crop mulches for the control Fusarium fruit rot in pumpkin production. *Plant Disease* 88:xx-xx (submitted).

Wyenandt, C.A., L.H. Rhodes, R.M. Riedel and M.A. Bennett. 2008. Control of fruit rots of processing tomato with cover crop mulch and Tom-Cast. *HortTechnology* 18:xx-xx (submitted).

5-year Proceedings/Conference Publications:

Dikshit, S., M.A. Bennett, R.J. Precheur, R.M. Riedel, and M.D. Kleinhenz.. 2004. Transplant quality, yield and disease control in fresh market tomato as affected by paclobutrazol and commercial biocontrol agents. *Acta Hort.* 631:283-289

Grassbaugh, E.M., E.E. Regnier, M.A. Bennett and R.M. Riedel. 2004. Comparison of organic and inorganic mulches for heirloom tomato production. *Acta Hort* 634:171-176.

Sako, Y., A. Hoffmaster, K. Fujimura, M.B. McDonald and M.A. Bennett. 2004. Applications of computers in seed technology. *Acta Hort*. 631:15-29.

Vitanza, S., C. Welty, R.C. Derksen, M.A. Bennett and S.A. Miller. 2006. Effect of plant population density and pesticide application technology on insect pests, diseases, and yield of bell peppers in Ohio. Fifth Nat'l IPM Symposium (St. Louis).

Magnitskiy, S., C. Pasian, M. Bennett, J. Metzger. 2006. Controlling seedling height in salvia by treating seeds with paclobutrazol solutions. First Colombian Congress of Horticulture (Bogata), pp. 198-198.

Miller, S.A., S. Vitanza, M. Bennett, R. Derksen, C. Welty. 2006 Spacing studies in peppers. Great Lakes Fruit, Veg and Farm Market Expo, Grand Rapids, MI.
<www.glexpo.com/abstracts/2006>

McDonald, M.B., A.F. Evans, M.A. Bennett, K. Fujimura, Y. Sako and L. Xu. 2008 Using the seed vigor imaging system for improving stand establishment. *Acta Hort* 782:83-92.

5-year Grant Activity:

2003

	Amount Requested	Amount Awarded
Private Partnership		
- Cotton seed imaging work (w/ McDonald, Fujimura, Evans)	\$ 118,124 (2 yrs)	\$ 63,552
OH Veg & Small Fruit Research & Development Program		
- Fresh market plum tomato germplasm evaluation (w/ Grassbaugh)	\$ 5,000	\$ 3,000
ODA/USDA Spec. Crop Block Grant		
- Optimizing spray application technology for vegetable crops (w/ S. Miller, et al.)	\$ 13,797	\$ 13,797
Mid-America Food Processors Assoc.		
- Processing tomato transplants and biological control agents	\$ 5,000	\$ 4,000
USDA/CSREES Higher Education Grants Program		
- Distance education modules for seed science (w/ McDonald, et al)	\$ 95,000	0
SBC Faculty Research Grant Competition		
- Distance education for seed science (w/ McDonald, et al)	\$ 30,000	0
Amer. Distance Education Consortium (ADEC)		
- Distance education modules for seed science (w/ McDonald, et al)	\$ 50,000	\$ 50,000
USDA/CSREES PMAP (Pesticide Mitigation) Program		
- Improved pepper crop production and pest mgmt. Strategies (w/ C. Welty, et al)	\$ 82,519	\$ 82,519 (yr 1)
Pickle Packers, Int'l./Field Research Committee		
- Cabbage, cucumber and pepper seed vigor analysis for improved seedling establishment	\$ 4,950	0
OARDC Interdisciplinary Team Competition		

- An automated system for seed measurement and purity analysis (w/ McDonald, Tay, Fujimura) USDA/NCR-SARE	\$100,000 (2 yrs)	0
- Integrating reduced herbicide rates with cover crop mulches in pumpkin production (w/ A. Wyenandt et al.)	<u>\$103,169 (2 yrs)</u>	<u>0</u>
2003 total	\$ 442,686	\$ 216,868

2004

USDA/CSREES PMAP		
- Pepper production and pest management (w/ C. Welty, et al)	\$ 82,519	\$ 82,519 (yr 2)
OH Veg and Small Fruit Research & Development Program		
- Sweet corn seed treatment (w/ E. Grassbaugh)	\$ 3,000	\$ 3,000
- Vegetable seed vigor assessment (w/ Grassbaugh, Evans)	\$ 6,000	\$ 6,000
- Plum and Staked Tomato Germplasm Evaluation (w/ Grassbaugh, Harker, Bergefurd)	\$ 5,000	\$ 5,000
-Specialty Vegetable Crop Evaluations (w/ Grassbaugh, Kleinhenz)	\$ 3,000	\$ 3,000
-Using Admire as a seed soak treatment for pumpkins: its effect on germination, phytotoxicity, and efficacy (w/ Jasinski, Welty)	\$ 1,900	withdrew
-Eliminating seed pathogens (w/ S. Miller)	\$ 3,500	\$ 3,500
Mid-America Food Processors Association		
- Tomato cell size research	\$ 5,000	\$ 4,000
OARDC Industry Small Grant Competition (New Crops/New Cultivars for Ohio)		
	\$ 5,000	\$ 0
USDA/CSREES Managed Ecosystems		
-Applying precision earthworm management to increase the ecological and economic sustainability of organic farming (w/ R. Ehsani, H. Chaoui, et al.)	\$437,581	\$ 0
OARDC-GREGP		
-Effects of maternal environment on Asteraceae seed dormancy, germinability and storability (w/ S. Contreras) Campbell Soup Res. & Devel.	\$ 5,000	\$ 5,000
-Seed treatments to eliminate plant pathogens, and effects on seedling vigor (w/ S. Miller)	\$ 5,000	\$ 5,000
USDA/CSREES Integ. Organic Program		
-Biological and cultural practices for improved edamame and food grade soybean seed production (w/ B. McSpadden-Gardener, et al.)	\$ 362,986 (3 yrs)	\$ 0
-Organic high tunnel production in the Midwest (w/ M. Kleinhenz)[subcontract w/ L. Jett (MO)]	\$ 53,748 (2 yrs)	\$ 0
2004 total	\$ 974,234	\$ 117,019

2005

OH Veg & Small Fruit Research & Development Program (w/ Grassbaugh, others)		
-Sweet corn seed treatment	\$ 3,500	\$ 1,750
-Transplant studies	\$ 6,700	\$ 5,000
-Specialty crops	\$ 4,000	\$ 2,000
-Plum tomato germplasm evaluation	\$ 5,000	\$ 2,500
-Insecticide seed treatments for cucurbits (w/ C. Welty, et al)	\$ 5,000	\$ 4,000

Mid-America Food Processors Assoc.		
-Transplant cell size and copper treated plug trays (w/ Grassbaugh)	\$ 5,000	\$ 4,000
USDA – North Central IPM Center		
-IPM implementation in home vegetable gardens (w/ C. Welty, S. Miller, D. Doohan, M. Tucker, et al)	\$ 70,426	\$ 71,851
USDA/CSREES Integrated Organic program		
-Integrating biological and cultural practices for improved organic edamame and tofu food-grade soybean seed production (w/ B. Mc Spadden Gardener, S. Miller, D. Stinner)	\$ 296,935	\$ 0
OARDC Industry Small Grant Competition		
-Vegetable transplant studies (w/ E. Grassbaugh)	\$ 6,000	\$ 6,000
USDA IR-4 and Industry Sponsors		
-Insecticide seed treatments for cucurbits (w/ C. Welty, et al)	\$ 7,000	\$ 7,000
AOSA Seed Testing Research Committee		
-Light and temperature interactions in promoting germination of wildflower species (w/ S. Contreras, D. Tay)	\$ 5,000	\$ 0
Knox-Wittmeyer Scholarship Fund		
-Asteraceae seed biology (w/ S. Contreras, D. Tay)	\$ 3,000	\$ 0
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2005 total	\$ 412,562	\$ 92,601

2006

Ohio Vegetable and Small Fruit Research and Development Program		
- Copper Treated Containers for Vegetable Transplant Production	\$ 3,000	\$ 3,000
- Use of ABA and PEG 8000 to Control Vegetable Transplant Height	\$ 3,500	\$ 3,500
-Evaluation of New Vegetable Cultivars Under Northwest Ohio Growing Conditions (w/ Grassbaugh)	\$ 3,200	\$ 3,200
Mid-America Food Processors Association		
-Use of ABA to Control Processing Tomato Transplant Height	\$ 4,000	\$ 4,000
OARDC Industry Small Grant Competition		
-Use of ABA and PEG 8000 to Control Vegetable Transplant Height	\$ 6,000	\$ 6,000
Paul C. and Edna H. Warner EndowmentFund for Sustainable Agriculture Interdisciplinary Grant Program for On-Farm Research		
-Organic/transitional edamame (vegetable soybean) and sweet corn seedling establishment	\$ 2,775	\$ 2,775
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2006 Total	\$ 22,475	\$ 22,475

2007

Ohio Vegetable and Small Fruit Research and Development Program		
- Organic/transitional edamame (vegetable soybean) and sweet corn seedling establishment	\$ 2,200	\$ 2,200
- Use of Jasmonic Acid on Tomatoes to Release the Plant's Natural Defense Mechanisms and Increase Plant Stress Tolerance	\$ 4,000	\$ 0
- Evaluation of New Vegetable Cultivars Under Northwest Ohio Growing Conditions (w/ Grassbaugh)	\$ 3,400	\$ 0
-Use of ABA and PEG 8000 to Control Tomato and Pepper Transplant Height and Enhance Crop Production	\$ 3,800	\$ 3,800
Wittmeyer-Knox/Wittmeyer Scholarship Program		
-Organic/transitional edamame and sweet corn seedling Establishment (w/ E. Grassbaugh, Jordan Miller)	\$ 3,000	\$ 2,200

Mid-America Food Processors Assoc.

-Chemical pinching of processing tomato blooms for fruit set and yield management	\$ 3,650	\$ 3,650
-Use of ABA to control processing tomato transplant height	\$ 4,000	\$ 4,000
USDA/Home IPM Grant (w/ C. Welty, E. Grassbaugh)	<u>\$ 6,000</u>	<u>\$ 6,000</u>
2007 Total	\$ 30,050	\$ 21,851
1986-2007 Total	\$ 5,453,800	\$1,749,015(~ 32%)
Avg./yr	\$ 247,900	\$ 79,500

2008

Ohio Vegetable and Small Fruit Research and Development Program

-Use of biological treatments for disease control in sweet corn	\$ 3,500	\$ 3,500
-New Vegetable Cultivar Releases for 2008	\$ 3,000	\$ 3,000
Mid-America Food Processors Assoc.		
-Plant Population and Cultivar Selections for Optimum Yield in Processing Tomatoes	\$ 5,000	\$ 5,000
USDA/CSREES PMAP		
-Integration of azinphos-methyl (Guthion) alternatives into a Parsley crop management program (w/ J. Jasinski, C. Welty, S. Miller, D. Doohan, R. Precheur)	\$ 161,734	pending
USDA-Higher Ed. Challenge (HEC) grant	<u>\$ 450,000</u>	<u>pending</u>
2008 Total (to date)	\$ 623,234	\$11,500

5-year Presentation List:

2003

Indiana Raw Products/Horticulture Conference (Indianapolis, IN)

- Paclobutrazol Seed Soak Effects in Processing Tomatoes

Ohio Fruit and Veg Growers Congress (Toledo, OH)

- Sweet corn seedling establishment

- Transplant Physiology and Handling

Ohio Ecological Food and Farm Association (Johnstown)

- Seed production research

Society of Commercial Seed Technologists (Seattle) National Conference

- SSAA tests for vegetable seeds

2004

Ohio Fruit/Veg Growers Congress (Toledo)

-Sweet corn seed treatments

-Pickling cucumber plant populations

Int'l. Sweet Corn Devel. Association (Chicago)

-Seedling establishment strategies

2005

New York Vegetable Conference (Syracuse)

-Vegetable transplant production

-Sweet corn seed vigor

Ohio Fruit/Veg Growers Congress (Toledo)

- Vegetable transplant physiology
Indiana Horticulture Conference (Indianapolis)
- Processing tomato transplant management

2006

- Ohio Fruit/Veg Growers Congress (Columbus)
- Pickling cucumber production panel
- New York Vegetable Conference (Syracuse)
- Pepper spacing interactions with crop growth and yield
- AOSA/SCST/Workshop & Symposium (Indianapolis)
- Vigor testing and vegetable crop performance

2007

- Ohio Fruit/Veg. Growers Congress (Columbus)
- Great Lakes Veg Working Group (Leamington, ONT)
- Lettuce Seed Production
- Sokoine Univ. of Agric. (Tanzania)
- Seed treatment and transplant tactics for improved vegetable crop production

2008

- Great Lakes Veg. Working Group (Purdue Univ.)
- Organic seed treatment studies
- AOSA/SCST Annual Meetings (St. Paul, MN)
- Lettuce seed physiology, production and quality

Web Page Link:

<http://ohioline.osu.edu/~seedbio/>