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## BIOGRAPHICAL SKETCH

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<b>NAME:</b> Bruce B. Clarke	<b>POSITION TITLE:</b> Extension Specialist/Professor, Turfgrass Pathology
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### EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Rutgers University	PhD	1982	Plant Pathology
Rutgers University	BS	1977	Forest Management

### EMPLOYMENT HISTORY

<b>Extension Specialist in Turfgrass Pathology</b> , Department of Plant Biology & Pathology, Rutgers Cooperative Extension (RCE), NJ Agric. Exp. Stn. (NJAES), School of Environmental and Biological Sciences (SEBS), Rutgers University (70% Extension, 20% Research, 10% Teaching)	1997-present
<b>Director, Center for Turfgrass Science</b> , NJAES/SEBS, Rutgers University	1994-present
<b>Chairman, Department of Plant Biology &amp; Pathology</b> , NJAES/SEBS, Rutgers University	2012-2014
<b>Adjunct Professor</b> , Department of Plant Pathology, College of Agric. and Life Sci., NC State University, Raleigh, NC	2011- 2014
<b>Ralph Geiger Endowed Chair in Turfgrass Science</b> , Department of Plant Biology & Pathology, NJAES/SEBS, Rutgers University	2005-2011
<b>Vice Chair, Department of Plant Biology &amp; Pathology</b> , NJAES/SEBS, Rutgers University	2001-2011
<b>Chair, Department of Plant Pathology</b> , NJAES/Cook College, Rutgers University	1999-2001
<b>Associate Extension Specialist in Turfgrass Pathology</b> , Department of Extension RCE, Specialists, NJAES/Cook College, Rutgers University	1988-1997
<b>Assistant Extension Specialist in Turfgrass and Ornamental Pathology</b> , Department of Extension Specialists, RCE, NJAES/Cook College, Rutgers University	1982-1988

### RESEARCH EXPERIENCE

My research has focused on the identification and control of biotic and abiotic diseases of cool-season turfgrasses. This has involved the use of field studies to assess pathogen dynamics, as well as controlled environment and greenhouse studies to ascertain the relationship between environmental stress, cultural management, and disease development. Research has also been conducted on disease forecasting and detection systems, and the identification of disease resistance in turfgrass germplasm. The principal goal of my outreach program has been the development of best management practices for the control of turfgrass diseases such as anthracnose, dollar spot, gray leaf spot, and patch diseases caused by root- and crown-infecting fungi. My research findings have been utilized by turf managers in North America, Europe and Austral-Asia to improve disease control and turfgrass quality, while reducing chemical inputs through the use of improved disease management strategies.

**Refereed Journal Publications: (2011-2015)** \*indicates senior author was one of Clarke's graduate students or was from Clarke's Laboratory.

Schmid\*, C.J., J.A. Murphy, B.B. Clarke, M. DaCosta, and J.S. Ebdon. 2016. *Observations on the effect of potassium on winter injury of annual bluegrass in New Jersey in 2015*; *Accepted for publication 27 Sept. 2015 in Crops, Forage, and Turfgrass Management manuscript number ATS-BR-15-0170.*

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- Beirn\*, L.A., Meyer, W.A., Clarke, B.B., and Crouch, J.A. 2016. *A Greenhouse-Based Inoculation Protocol for Fungi Causing Crown Rust and Stem Rust Diseases of Kentucky Bluegrass Turf*; in internal review for submission to HortScience: *In Press*
- Beirn\*, L.A., R. Wang, B.B. Clarke, and J.A. Crouch. 2015. *Development of a greenhouse-based inoculation protocol for the fungus Colletotrichum cereale pathogenic to annual bluegrass (Poa annua)*; PeerJ 3:e1153 <https://dx.doi.org/10.7717/peerj.1153>.
- Hempfling\*, J.W., B. B. Clarke, and J. A. Murphy. 2015. *Anthracnose disease on annual bluegrass as influenced by spring and summer topdressing*. Crop Sci. 55 (1-2): 437-443; doi: 10.2135/cropsci 2014.04.0297.
- Beirn\*, L.A., B.B. Clarke, and J A. Crouch. 2014. *Influence of host and geographic locale on the distribution of Colletotrichum cereale lineages*; PLoS ONE 9(5): e97706. doi:10.1371/journal.pone.0097706
- Inguagiato\*, J.C., J.A. Murphy, and B.B. Clarke. 2013. *Topdressing sand particle shape and incorporation effects on anthracnose severity of an annual bluegrass putting green*. J. Int.Turf Soc. 12: 127-134
- Inguagiato\*, J.C., J.A. Murphy, and B.B. Clarke. 2012. *Sand topdressing rate and interval effects on anthracnose disease severity of an annual bluegrass putting green*. Crop Sci. 52:1406-1415
- Roberts\*, J.A., B.B. Clarke, and J.A. Murphy. 2012. *Lightweight rolling effects on anthracnose of annual bluegrass putting greens*. Agron. J. 104(4):1176-1181.
- Zhao,S., B.B. Clarke, Q. Shen, J. Hu, L. Zhang and N. Zhang: 2012. *Development and application of a TaqMan real-time PCR assay for rapid detection of Magnaporthe poae*. Mycologia: 104:1250-1259. doi:10.3852/11-365
- Beirn\*, L.A., M. Moy, W.A. Meyer, B.B. Clarke, and J.A. Crouch. 2011. *Molecular analyses of turfgrass rusts reveals the widespread distribution of Puccinia coronata as a pathogen of Kentucky bluegrass in the United States*. Plant Dis. 95:1547-1557.
- Roberts\*, J. A., J. C. Inguagiatio\*, B. B. Clarke, and J. A. Murphy. 2011. *Irrigation Quantity Effects on Anthracnose Disease of Annual Bluegrass*. Crop Sci.51: 1244-1252.
- Espevig, T., M. DaCosta, L. Hoffman, T. S. Aamlid, A. Tronsmo, B.B. Clarke and B. Huang. 2011. *Freezing tolerance and carbohydrate changes of two Agrostis species during cold acclimation*. Crop Sci. 51:1188-1197.
- Njambere, E.N., B.B. Clarke, and N. Zhang. 2011. *Dimeric oligonucleotide probes enhance diagnostic macroarray performance*. Journal of Microbiological Methods 86: 52–61. doi:10.1016 / j.mimet.2011.03.015

**Non-referred Publications: (2011-2015)** \*indicates senior author was one of Clarke's graduate students or was from Clarke's Laboratory.

- Schmid\*, C. J., J.W. Hempfling, B. B. Clarke, and J.A. Murphy. 2015. *Tackling anthracnose disease on annual bluegrass greens*. NZ Turf Mgmt J. Autumn 2015: 8-10.

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- Clarke, B.B. and J. Murphy. 2015. *Working outline of best management practices for anthracnose control of annual bluegrass putting green turf0 2015 update*. Rutgers Center for Turfgrass Science Website ([www.turf.rutgers.edu](http://www.turf.rutgers.edu))
- Clarke, B.B. 2015. *2015 International Turfgrass Society (ITS) mid-conference meeting and 2017 International Research Conference planning meeting*. International Turfgrass: The Newsletter of the ITS (November 2015 edition. ISSN 2312-6558)
- Beirn\*, L.A., Schmid, C.J., Hempfling, J.W., Murphy, J.A., Clarke, B.B., and Crouch, J.A. 2015. Impact of fertility on microorganism communities in the *Poa annua* rhizosphere. *Golf Course Management* 83(1):120
- McDonald, S. J., R. Grala, and B. B. Clarke. 2014. *Brown ring patch severity on Poa annua greens*. *Golf Course Management* 82: 86-94
- Schmid\*, C. J., B. B. Clarke, and J.A. Murphy. 2014. *Potassium affects anthracnose*. *Golf Course Management* 82(1):150
- Murphy, J.A., J. Hempfling, R. Wang, and B. B. Clarke. 2013. *Topdressing versus anthracnose: A look at the best topdressing practices for preventing anthracnose in annual bluegrass*. *Golf Course Management* 69(12): 30-33
- Murphy, J., B. Clarke, C. Schmid, J. Hempfling, and R. Wang. 2013. Best management practices for anthracnose disease on annual bluegrass putting greens. *USGA Turfgrass and Environmental Research Online*. March/April. 12(2): p. 16-17.
- Schmid\*, C., J. Murphy, and B. B. Clarke. 2013. *Rutgers researchers seek best management practices to keep anthracnose at bay*. *Tri-state Newsletter*, Fall 2013 issue
- Crouch\*, J.A. and B. B. Clarke. 2012. *Biology and pathology of turfgrass anthracnose*. *Golf Course Management* 80(5):96-102
- Murphy, J. A., J. A. Inguagiato, and B. B. Clarke. 2012. *Best management practices for anthracnose on annual bluegrass*. *Golf Course Management* 80(5):104-110
- Beirn\*, L.A., Clarke, B.B., Tredway, L.P., Carbone, I., Boehm, M.J., Orshinsky, A. and Crouch, J.A. 2012 *Renaming the dollar spot fungus*. *Golf Course Management* 80(1):114
- Beirn\*, L.A., Moy, M., Meyer, W.A., Clarke, B.B. and Crouch, J.A. 2012 *Molecular analysis of turfgrass rusts reveals widespread distribution of Puccinia coronata as a pathogen of Kentucky bluegrass in the U.S.* *Golf Course Management* 80(1):107-108.
- Njambere, E.N., B. Clarke, S. Bonos, J. Murphy, R. Buckley, S. Tirpak and N. Zhang. 2012. *First report of brown ring patch caused by Waitea circinata var. circinata on Poa annua and Agrostis stolonifera in New Jersey*. *Golf Course Management* (An official publication of the Golf Course Managers Association). 80(1):105-106

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**Outreach Publications: (2011-2015)**

J. A. Murphy, and B. B. Clarke. 2007-2015. Developing Best Management Practices for Anthracnose Control on Annual Bluegrass Putting Greens Turf. 4pp. (<http://www.turf.rutgers.edu>)

Clarke, B.B. and S. McDonald. 2013. Cutting Edge Disease Identification and Management. Golf Course Superintendents Association of America, Lawrence, KS. 168 pp. (text revised each year for a one day workshop, and 3 to 4 regional seminars held throughout the United States, presented to golf course superintendents from different parts of the world).

Clarke, B.B. and B. Martin. 2004-2012. Cutting Edge Disease Identification and Management. Golf Course Superintendents Association of America, Lawrence, KS Ranged from 132 to 198. (text revised each year for a one day workshop, and 3 to 4 regional seminars held throughout the United States, presented to golf course superintendents from different parts of the world).

**NJAES Hatch Projects (2011-2015)**

Roberts, J., B. Clarke, J. Murphy, N. Zhang, et al. 2016-2021, *Explorations into the Turfgrass Phytobiome: Establishing Standardized Research Methodology for Studying Microbial Communities and Developing Reliable Applications for Turfgrass Management*. (NE\_TEMP2361 Turfgrass Regional Research Project; coordinated writing of project proposal with J. Roberts along with 15 scientists from throughout North America)

Koppenhofer, A., F. Wong, B. B. Clarke, et. al. 2011-2016. *Management of Annual Bluegrass on Golf Courses: Improved Practices for Maintenance, Pest Control, and Viable Techniques for Transition to More Desirable Grasses* (NE-1046 Turfgrass Regional Research Project; Coordinated writing of project proposal with A. Koppenhofer and F. Wong along with 20 other scientists from throughout North America and Canada).

**Rutgers Turf Blog** (<http://turfblog.rutgers.edu/>): contributor (2012 – present)

**COMPETITIVE GRANTS and CONTRACTS RECEIVED**

Total External and Internal Competitive Grants (1990-2015).....\$4,571,819  
(USDA-NIFA, USDA-SRI, and NE IPM, USGA, GCSAA, GCSANJ, NJTF, Tri-State Found., Rutgers)

Total External Contracts (1987- 2015)..... \$7,576,845

**FUNDRAISING EFFORT AS CENTER DIRECTOR: (1996-2015)**

Total External Gifts to Turf Program.....\$11,890,000

**TEACHING EXPERIENCE**

16:765:536. *Plant Disease Diagnostics* (graduate course, 100% resp., alternate years, 3 cr.) 1982-present

11:776:408 *Turfgrass Pest Science* (undergraduate course, 50% resp., alternate years, 4 cr.) 1999-present

11:776:389 *Applications of Irrigation and Equipment Technology* (Undergraduate course, 100% responsibility, alternate years, 3 cr.) 2007-present

*Case Studies in Turfgrass Mgm't* (2 Yr Prof. Golf Turf Mgm't Prog. 50% resp., Sp & Fall) 2000-present

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**GRADUATE AND POST DOCTORAL ADVISING: (1982-2015)**

Doctoral Thesis: Primary Advisor – 9

Masters Thesis: Primary Advisor – 11

Graduate Committee Member – 23

Post-Doctoral Fellows/ Visiting Scientists -7

Undergraduate Independent Study Students: 5

**EXTENSION/OUTREACH PRESENTATIONS:**

Presents over 65 educational presentations, workshops, webcasts, and in-service programs each year to extension clientele and county staff at national and state meetings, conferences, and field days.

**HONORS AND AWARDS**

USGA Green Section Award from the United States Golf Association (2016)

Col. John Morley Distinguished Service Award from the Golf Course Superintendents Association of America (2014)

American Phytopathological Society Fellow Award (2012)

Award of Merit - Northeastern Division of the American Phytopathological Soc. (2011)

Northeast Award for Excellence in Multistate Research from the Northeastern Regional Association of State Agricultural Experiment Station Directors (2011)

Visionary Leadership Award from the Epsilon Sigma Phi National Extension Society (2011)

Distinguished Alumni Award - Graduate School, Rutgers Univ. (2008)

Dennis Fenton Graduate Alumni Award - Cook College, Rutgers University (2007)

Outstanding Professor of the Year Award - Graduate Student Assn., Rutgers (2007)

Team Research and Outreach Award - Rutgers Cooperative Extension (2011, 2007, 1996)

Fellow Awards - Crop Science Society of America (2006); American Society of Agronomy (2004)

Ralph Geiger Endowed Chair - Rutgers University (2005)

Distinguished Service Award - Golf Course Superint. Assn. NJ (2003)

Extension Excellence Award - Rutgers Cooperative Extension (2003)

John Reid Lifetime Achievement Award - Metro. Golf Course Sup. Assn. – (2002)

Weisblat Award for Excellence in Research, Teaching, and Outreach - NJ Agric. Exp. Stn. (2001)

Hall of Fame Award - New Jersey Turfgrass Assn. (1996)

**PROFESSIONAL MEMBERSHIP AND SERVICE ACTIVITIES**

Member of the American Phytopathological Society (APS, 1978-present), American Society of Agronomy (1993-present), American Association for the Advancement of Science (1978-present), Crop Science Society of America (1993-present), European Turfgrass Society (2008-present), International Turfgrass Society (1985-present; President [2013-2017], Board of Directors [2001-2009]), NE APS Div (1978-present, President [2000-2001]).

Associate Editor - Plant Disease (1997-1999).

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Journal Reviewer: Plant Disease (1989-present), Phytopathology (1991-present), Applied Turf Sci. (2000-present), Agronomy Journal (1995-present), Soil Biology and Biochemistry (1995-present), Journal of Turfgrass Management (1994-2003), Journal of the International Turfgrass Soc. (2001, 2009, 2013), Crop Science (2002-present), Mycological Research (2009-present), Plant Mgm't Network (APS, 2015-present).

Program Reviews: Univ. of FL Turf Program (1997), NC State Center for Turfgrass Science (2015)

Grant Panels: Canadian National Science and Engineering Council (1998-2008) and the Tri-State Research Foundation (1998)

Tenure Packet Reviewer: three to five packets/yr for universities in US and Canada (1997-present).

Junior Faculty Mentoring Committees: 12 (1990- present at Rutgers Univ.)