

BIOGRAPHICAL DATA

for

Claude E. Boyd

Personal:

Born - Hatley, Mississippi U.S.A.; November 14, 1939.

Address - Department of Fisheries and Allied Aquacultures, Auburn University, Alabama 36849
(Office); P.O. Box 3074, Auburn, Alabama 36831 (Home).

Telephone - 334-844-4078 (Office); 334-887-8012 (Home).

Fax - 334-844-5933 or 334-844-9208 (office); 334-502-7261 (Home).

E-mail: ceboyd@acesag.auburn.edu

Language proficiency: English (native speaker); Thai (good); Spanish (fair).

Education and Area of Specialization:

B.S. (Entomology and chemistry) 1962, M.S. (Environmental toxicology) 1963, Mississippi State University; Ph.D. (Water and aquatic soil chemistry) 1966, Auburn University.

Employment History:

Instructor, Mississippi State University 1963; Aquatic Biologist, Federal Water Pollution Control Administration 1966; Assistant Professor, Auburn University, 1967; Ecologist, Savannah River Ecology Laboratory, University of Georgia 1968-70; Associate Professor, Auburn University, 1971-77; Professor, Auburn University, 1977-present; Butler/Cunningham Eminent Scholar in Agriculture and the Environment, Auburn University, 2001-2006.

Honors and Awards:

B.S. Degree with "Special Honors"

Phi Kappa Phi (scholastic)

Research Award, Catfish Farmers of America

Distinguished Service Award, Catfish Farmers of America

Award of Excellence, Bioengineering Section, American Fisheries Society

Dean's Award for Contributions to Agriculture, Auburn University

Director's Senior Research Award, Alabama Agricultural Experiment Station, Auburn University

Research Achievement Award, Surathani Prawn Producers Association, Surathani, Thailand

Creative Research Award, Research Advisory Council, Auburn University.

Honorary Life Membership Award, World Aquaculture Society

Teaching:

1. Classes taught at Auburn University

Water Science (taught annually)

Water and Sediment Quality Management in Aquaculture (taught alternate years)

2. Graduate program involvement
Graduate Council at Auburn University (1978-1981).
Student committees:
Major professor - 57 M.S., 47 Ph.D.
Committee member - 68 M.S., 32 Ph.D.
3. Postgraduate training
Provided training of 1- month to 24-month duration for 23 visiting scientists.
4. Other
Each year, I assist with several workshops for fishery biologists, fish farmers, and professional aquaculturists.

Committees, Boards, and Panels:

Southern Regional Aquaculture Center, Steering Committee for four projects
Catfish Farmers of America, Research Committee (3 years)
World Aquaculture Society, Co-Program Chairman for 1996 annual meeting in Bangkok, Thailand
Environmental Sciences Committee, School of Agriculture, Auburn University (Current)
Auburn University representative to the University Council of Water Resources (Current)
Oceanic Institute, Industry Liaison Committee (Current)
Editorial Boards:
Progressive Fish Culturist (3 years)
Aquaculture (2 years)
Journal of Aquaculture in the Tropics (Current)
Journal of Applied Aquaculture (Current)
Reviews in Fisheries Science (Current)
National Academy of Sciences, Panel on Aquatic Weeds (1978)
USEPA, Environmental Biology Review Panel (1981-1984)
USEPA, Program Review, Corvallis, Oregon (1984)
U.S. National Research Council and Academia Sinica, Taiwan, Panel on Aquacultural Engineering and Simulation (1985)
NACA Working Group on Aquaculture Sustainability, Beijing, China (1995)
FAO/WHO/NACA Working Group on Aquaculture Product Food Safety, Bangkok, Thailand (1997)
FAO Expert Consultation on sustainable Shrimp Farming, Bangkok, Thailand (1997)
FAO Ad-Hoc Meeting on Criteria and Indicators of Sustainable Shrimp Farming, Rome, Italy (1998)

Consulting:

I have served as a consultant to the following:

University of Florida 1976 (aquatic weed control)
North Carolina State University 1978 (water quality instruction)

Mississippi State University 1979 (water quality instruction)
 U.S. Fish and Wildlife Service 1979, 1981, 1983, 1987 (water quality instruction)
 Fitts Farms, Alabama 1979 (assessment of minnow farm)
 T.E. Wanamaker, South Carolina 1980 (aeration)
 Inverness, Alabama 1980 (turbidity control)
 Occidental Chemical Company, Florida 1981 (water quality and mine reclamation)
 Holland and Knight, Florida 1981 (water quality standards)
 Vulcan Materials Company, North Carolina 1981-1983 (water quality standards)
 Carpenter's Gold Fish Farm, California 1981 (pond water quality management)
 Aeration Industries, Minnesota 1981-1986, 1995-1996 (aerator testing)
 McDonald Co., Tennessee 1982 (aerator testing)
 Carolina Power and Light, North Carolina 1983 (water quality standards)
 Government of Suriname 1983 (site selection for research station)
 Savannah River Ecology Laboratory, South Carolina 1984, 1991-1993 (pond and lake management)
 Westinghouse, Savannah River Plant, South Carolina 1990, 1991 (pond management)
 DuPont, Savannah River Plant, South Carolina 1984-1988 (pond design and management)
 Engelhard Corporation, Georgia 1984, 1990, 1991, 1994, 1995, 1996 (water quality standards)
 FAO, India 1984, 1988, 1991 (pond water quality management)
 Green, Dees, and France, LLP, Florida 1985 (fish kill investigation)
 North Carolina Division of Boating and Inland Fisheries 1985 (pond water quality management)
 The Power House, Maryland 1985-1987 (aerator testing)
 Florida Bureau of Marine Research 1986 (pond design)
 Pac Mar/Asian Development Bank, Thailand 1987, 1988 (water quality in shrimp farming area)
 Lake Management Services 1987 (salinity and freshwater fish)
 EMC Engineering, Georgia 1987 (pond reclamation)
 Proexporca Shrimp Farm, Ecuador 1987 (shrimp pond water quality management)
 CSRIO and private shrimp farmers, Australia 1987 (shrimp pond water and soil management)
 Southland Fisheries and Camp O'Brien, North Carolina 1988 (pond liming)
 Acapolon Shrimp Farm, Guatemala 1988 (shrimp pond water quality management)
 USDA/OCID, Taiwan 1989 (shrimp farming practices)
 Science and Technology Development Board, Thailand 1989 (shrimp farming research evaluation)
 Bechtel International, Thailand 1990 (shrimp pond sediment control)
 Acuespecies Shrimp Farm, Ecuador 1990, 1992, 1993, 1994 (shrimp pond water quality management)
 Inducam Shrimp Farm, Ecuador 1990, 1991, 1992, 1993, 1994 (shrimp pond water quality management)
 Deakin University, Warrnambool, Australia 1990-1991 (instructional material on water quality)
 DIBSA, Continental Grain Co., Ecuador 1987-1992 (shrimp pond water quality management)
 San Miguel Corp., Agricultural Division, Philippines 1991 (shrimp pond water quality

management)
Dole Philippines, Seafood Division, 1991 (shrimp pond water quality management)

American Soybean Association, Philippines and Thailand 1989, 1991 (shrimp pond water quality management)
American Soybean Association, Colombia 1994, 1995 (shrimp pond water quality management)
American Soybean Association, Venezuela 1997 (shrimp pond water quality management)
American Soybean Association, China 1997 (fish pond water quality management)
American soybean Association, Venezuela 1998 (soil and water quality management)
Aquastar, Thailand 1991, 1994 (shrimp pond water quality management)
Charoen Pokphand (C.P. Group) Feedmill Co., Thailand 1989, 1991 (shrimp pond water quality management)
Rosario Shrimp Farm, Ecuador 1990, 1992 (shrimp pond water quality management)
USDA/OCID, Thailand 1989, 1992 (shrimp farming practices)
Wilfley-Weber, Inc., Colorado 1992 (aerator testing)
Wildlife Int., Washington, D.C. 1992, 1995 (pond testing of pesticides)
Texas Aquaculture Association 1992 (freshwater aquaculture effluents; NPDES permits)
Texas Aquaculture Association 1993 (brackishwater shrimp farm effluents; NPDES permits)
MCR Acuicultura, Brazil 1994 (shrimp pond water quality management)
U.S. Army Corps of Engineers, Louisiana and Texas 1992 (evaluation of dredging project)
Laguna Madre Shrimp Farm, Belize 1992 (shrimp pond water quality management)
Biomarsa, Ecuador 1992, 1996, 1997 (shrimp pond water quality instruction)
Southern Machine Welding, Alabama 1992 (aerator testing)
Kimberly-Clark, Alabama 1992 (lake sedimentation problem)
ESPOL/CENAIM, Ecuador 1993, 1994 (shrimp pond water quality instruction)
Fisheries Information Mgt. Systems, Kentucky 1993 (lake fertilization)
Aquatic Ecosystems, Florida 1993 (aerator testing)
Benchmark Engineering, Alabama 1993 (fish kill investigation)
Aquamar Shrimp Farm, Ecuador 1993 (shrimp pond water quality management)
Agromarina Shrimp Farm, Panama 1993, 1996 (shrimp pond water quality management)
China Fisheries Soc. 1993 (water quality instruction)
CENIACUA (Shrimp Farmer's Association), Colombia 1993, 1995 (shrimp pond water quality instruction)
Cartegenera de Acuicultura, Colombia 1994, 1998, 2001 (shrimp pond soil and water quality management)
Asian Institute of Technology, Thailand 1994, 1995 (shrimp pond water quality instruction)
Union Carbide/Inge, Twitty, and Duffy, Alabama 1994-1996 (ground water pollution)
SQM Nitratos, Chile 1995, 1996, 1998 (pond fertilizers)
The Freshwater Institute (The Conservation Fund), West Virginia 1995 (acid mine drainage)
James Clements, Illinois 1995 (aerator design)
Agrosoledad, Colombia 1995 (shrimp pond water quality management)
Jay Capozzi, New York 1995 (pond site evaluation)
Shrimp Mart, Malaysia 1995 (shrimp pond water quality instruction)

Rodney Hale, 1995 (pond management)
 Garner Lake Home Owners Association, Germantown, Tennessee 1995 (lake management)
 Tanna Shrimp Mart, India 1995 (shrimp pond water quality instruction)
 Shrimp Culture II, Honduras 1995 (shrimp pond soil evaluation)
 NACA, Bangkok, Thailand 1995 (shrimp farming practices)
 Chomesmar Shrimp Farm, Costa Rica 1996 (shrimp pond water quality management)
 Nova Shrimp Farm, Belize 1996 (shrimp pond soil management)
 South China Sea Shrimp Farm, Viet Nam 1996 (shrimp pond soil management)
 Shrimp Mart, Thailand 1996 (shrimp pond water quality instruction)
 Southern Star Shrimp Farm, Texas 1996 (sedimentation pond design)
 Sekar Bumi Group, Indonesia 1996 (shrimp pond design and construction)
 Aquasol, Florida 1995-1996 (pond soil evaluation)
 Australia Prawn Farmers Association 1996 (shrimp pond management)
 World Bank, Thailand 1996, 1997 (shrimp farm rehabilitation project)
 Caribuena Foods, Inc., Belize 1996 (shrimp pond site evaluation and EIA)
 National Fisheries Institute, Virginia 1996 (shrimp farming and the environment)
 CH2M Hill, North Carolina 1996, 1997 (water quality standards)
 Codamet, Ecuador 1996, 1997 (shrimp pond aeration and evaluation of liming materials)
 Millander and Sons Seafood, Florida 1996 (shrimp pond water quality management)
 Modercorp, Ecuador 1996 (quality of pond source water)
 Inacua, Ecuador 1996 (water quality instruction)
 Tannol Holdings, Tanzania 1996, 1997 (shrimp pond site evaluation and EIA)
 Lake Tindall, LLP, Mississippi 1996, 1997 (fish kill evaluation)
 Ret-Ser Engineering Agency, Malaysia 1977 (shrimp pond construction)
 Japfa Comfeed, Indonesia 1997-1998 (shrimp pond water quality management)
 Chemie Ecuador 1997 (shrimp pond water quality research)
 Alabama Power Company 1997 (water quality standards)
 Global Aquaculture Alliance 1997-2001 (technical advisor)
 Diamasa, Ecuador 1997-1998 (shrimp pond fertilizers)
 Siembramar Shrimp Farm, Venezuela 1997 (shrimp pond water quality management)
 Camara de Acuicultura, Ecuador 1997-1998 (shrimp pond water quality instruction)
 S & N Sprayer Corporation, Mississippi 1997 (aerator design)
 Alfonso Delfini, Ecuador 1997, 1999 (tilapia pond water quality management)
 CRI, University of Rhode Island 1997, 1998, 1999 (shrimp farming practices)
 Union Carbide/Connelly and Williams, Alabama 1998 (ground water pollution)
 PT Banggai Sentral Shrimp, Indonesia 1998 (shrimp pond management and site evaluation)
 University of Monterey, Mazatlan Campus 1998 (shrimp pond water quality instruction)
 NESTA Advisors & Capital 1998 (shrimp farming in Thailand)
 World Bank 1998, 1999 (shrimp farming code of practice, Thailand)
 Nicovita Feeds, Peru 1998 (shrimp farming water quality management)
 Aqualma Shrimp Farm, Madagascar 1998, 1999, 2000, 2001 (shrimp pond soil and water quality management)
 Lasertec SA, Ecuador 1998 (silicate analyses)
 Granjas Marinas San Bernardo, Honduras 1999 (alkalinity control)
 BTG Golder Co., Thailand 1999 (water pollution control)
 Marfrisco Shrimp Farm, Ecuador 1999 (pond sediment management)

Plantaciones del Pacifico, Ecuador 1999, 2000 (shrimp pond soil reclamation)
 AquaNova Shrimp Farm, Mexico 1999 (blue-green algae control)
 National Prawn Company, Saudi Arabia 1999, 2000 (shrimp farm design and construction; technical advisor)
 NACA, Thailand 1999, 2000 (environmental issues in aquaculture)
 World Wildlife Fund, Belize 1999 (environmental issues in aquaculture)
 CENAIM, Ecuador 1997-2000 (advisor to water quality research program)
 Spring Hill Lake Home Owners Association, Tuscaloosa, Alabama 1999 (fish pond management and correction of sediment problem)
 Etec, Colombia 2000 (performance of water circulator for ponds)
 SeaFarms Dev. Copr., Oman 2000 (environmental assessment of shrimp farm project)
 World Bank, 2000 (shrimp farming case studies)
 Tecojete Shrimp Farm, Guatemala 2001 (water quality)
 Rosario, Ecuador 2001 (inland shrimp farming)
 Smithfield Foods and McGuire and Woods, North Carolina 2001 (hog farm waste management)
 Research Corporation of University of Hawaii 2001 (BMPs for shrimp farming in Honduras and Nicaragua)
 Las Tolas and LaFran Shrimp Farms, Ecuador 2001 (ground water quality for shrimp farms)
 La Garzal Shrimp Farm, Ecuador 2001 (ground water quality)

Grants and Contracts:

Obtained research grants as follows:

<u>Agency</u>	<u>Short title</u>	<u>Duration</u> (yrs)	<u>Amount</u> (\$)
Auburn University Water Resources Res. Inst.	1) Phytoplankton dieoffs in ponds	3	30,000
	2) Oxygen depletion in ponds	1	3,000
	3) Water exchange in ponds	1	5,000
USGS, Office of Water Res. and Tech.	Oxygen dynamics in ponds	3	47,000
TVA, National Fertilizer Center	Fluid fertilizers for ponds	3	9,000
Rodale Resources	Aerator evaluation	1	2,000
Aquashade, Inc.	Use of Aquashade in ponds	1	2,000
USDA/Aquaculture	1) Emergency aeration	2	18,000

	2) Feeding practices and effluents	3	61,000
Aeration Industries, Inc.	Aerator evaluation	3	6,000
Catfish Farmers	1) Aerator design	3	17,500
	2) Off-flavor in catfish	1	5,000
Aeras Water Resources, Inc.	Aerator evaluation	1	5,000
Penn. Power and Light Co.	Pure oxygen contact systems	2	10,000
US Gypsum Co.	Uses of gypsum in ponds	2	6,000
Alabama Div. Marine Res.	Water quality in mariculture ponds	3	20,000
USDA/BARD	1) Mixing and aeration	3	85,000
	2) Water quality in intensive, recirculating system	3	11,000
Alabama Dept. Env. Mgt.	1) Nutrient removal from wastewater with aquatic plants	2	80,000
	2) Pond effluent treatment in wetlands	2	76,000
USFWS	1) Pure oxygen contactors	1	20,000
	2) Copper dynamics in ponds	1	20,000
	3) Pond bottom soils	4	200,000
	4) Cage culture	2	35,000
	5) Carbon dioxide monitoring	1	10,000
	6) Water quality in striped bass ponds	2	40,000
USDA/SRAC	1) Water circulation	3	47,000
	2) Pond effluents	3	77,500
	3) Phosphorus control in ponds	5	150,000
	4) Feeding and water quality	3	30,000

	5) Bluegreen algae control	3	110,000
	6) Management of aquacultural effluents	3	84,000
USDA/OICD	US-Thailand Cooperation	1	2,000
NSF	US-Thailand Water quality in shrimp ponds	2	14,000
Carson Co.	Wastewater treatment by wetlands	3	30,000
Scott Co.	Slow-release fertilizers	2	18,000
Alabama Catfish Producers, Assoc.	1) Chlorination of ponds	1	27,000
	2) Effluent management	1.5	51,000
	3) Environmental audit	1	25,599
	4) Soil and water quality survey	2	13,776
	5) BMPs for catfish farming	3	65,000
USAID/OSU	1) Pond bottom soil research	1	49,500
	2) Pond bottom soil research	1	28,380
	3) Pond bottom soil research	1	35,983
	4) Pond bottom soil research	2	58,000
	5) Pond bottom soil research, Brazil and South Africa	2	95,757
	6) Pond bottom soil research, Thailand	2	87,332
Neozymes, Inc.	Evaluation of enzymes for water quality improvement	1	8,000
Chilean Nitrate Corp.	Sportfish pond fertilizer development	1	7,500
Auburn University	Butler/Cunnngham Eminent Scholar	5	≈400,000
Auburn University Environmental Institute	Copper dynamics of ponds	2	18,000

I have been the principal investigator on four, 5-year Hatch Projects at the Auburn University Agricultural Experiment Station. Total expenditure on these projects has been about \$375,000.

International Activities:

- (1) I have been involved in many short-term (<1 week to 6 months) activities in the following countries: Canada, Australia, Ecuador, Panama, Honduras, Suriname, Guatemala, India, France, Italy, Thailand, Indonesia, Israel, Philippines, Taiwan, Tanzania, Mexico, China, Colombia, Belize, Malaysia, Vietnam, Chile, Brazil, Costa Rica, Venezuela, South Africa, Egypt, Peru, Saudi Arabia, Madagascar, Oman, and Nicaragua.
- (2) Co-principal investigator for USAID/Aquaculture CRSP Project in Honduras (1990-1998).
- (3) Technical advisor to Global Aquaculture Alliance regarding Codes of Conduct for shrimp farming (1997-present).
- (4) Adjunct Professor, Faculty of Fisheries, Kasetsart University, Bangkok, Thailand (1988-present).
- (5) Technical advisor to Thailand Department of Fisheries, Bangkok, Thailand (1995-present).

Publications:

Journal Articles:

- Boyd, C.E. and D.H. Vickers. 1963. Distribution of some Mississippi amphibians and reptiles. *Herpetologia* 19:202-205.
- Boyd, C.E., S.B. Vinson, and D.E. Ferguson. 1963. Possible DDT resistance in two species of frogs. *Copeia* 1963:426-429.
- Vinson, S.B., C.E. Boyd, and D.E. Ferguson. 1963. Resistance to DDT in the mosquito fish, *Gambusia affinis*. *Science* 139:217-218.
- Vinson, S.B., C.E. Boyd, and D.E. Ferguson. 1963. Aldrin toxicity and possible cross-resistance in cricket frogs. *Herpetologica* 19:77-80.
- Boyd, C.E. 1964. Insecticides cause mosquito fish to abort. *Progressive Fish-Culturist* 26:138.
- Boyd, C.E. and D.E. Ferguson. 1964. Spectrum of cross-resistance to insecticides in the mosquito fish, *Gambusia affinis*. *Mosquito News* 24:19-21.
- Boyd, C.E. and D.E. Ferguson. 1964. Susceptibility and resistance of mosquito fish to several insecticides. *Journal of Economic Entomology* 57:430-431.
- Ferguson, D.E. and C.E. Boyd. 1964. Apparent resistance to methyl parathion in mosquito fish. *Copeia* 1964:706.
- Boyd, C.E. and J.M. Lawrence. 1966. The mineral composition of several freshwater algae. *Proceedings of the Annual Conference Southeastern Association of Game and Fish*

- Commissioners 20:413-424.
- Boyd, C.E. 1968. Evaluation of some common aquatic weeds as possible feedstuffs. *Hyacinth Control Journal* 7:26-27.
- Boyd, C.E. 1968. Freshwater plants: A potential source of protein. *Economic Botany* 22:359-368.
- Boyd, C.E. 1969. The nutritive value of three species of water weeds. *Economic Botany* 23:123-127.
- Boyd, C.E. 1969. Production, mineral nutrient absorption, and bio-chemical assimilation by *Justicia americana* and *Alternanthera philoxeroides*. *Archives fur Hydrobiologia* 66:139-160.
- Boyd, C.E. 1969. Vascular aquatic plants for mineral nutrient removal from polluted waters. *Economic Botany* 24:95-103.
- Boyd, C.E. 1970. Amino acid, protein, and caloric content of aquatic macrophytes. *Ecology* 51:901-906.
- Boyd, C.E. 1970. Boron accumulation by native algae. *American Midland Naturalist* 84:565-568.
- Boyd, C.E. 1970. Chemical analysis of some vascular aquatic plants. *Archives fur Hydrobiologia* 67:78-85.
- Boyd, C.E. 1970. Influence of organic matter on some hydrosol characteristics. *Hydrobiologia* 36:17-21.
- Boyd, C.E. 1970. Losses of mineral nutrients during decomposition of *Typha latifolia*. *Archives fur Hydrobiologia* 66:511-517.
- Boyd, C.E. 1970. Nutrient content of offal and small fish from some freshwater fish cultures. *Transactions of the American Fisheries Society* 99:809-811.
- Boyd, C.E. 1970. Production, mineral nutrient accumulation and pigment concentrations in *Typha latifolia* and *Scirpus americanus*. *Ecology* 51:285-290.
- Boyd, C.E. and R.D. Blackburn. 1970. Seasonal changes in the proximate composition of some common aquatic weeds. *Hyacinth Control Journal* 8:42-44.
- Boyd, C.E. and L.W. Hess. 1970. Factors influencing shoot production and mineral nutrient levels in *Typha latifolia*. *Ecology* 51:296-300.
- Polisini, J.M., C.E. Boyd, and B. Didgeon. 1970. Productivity and nutrient relationships in an oligotrophic South Carolina pond. *Oikos* 21:343-346.
- Boyd, C.E. 1971. Further studies on productivity, nutrient, and pigment relationships in *Typha latifolia* populations. *Bulletin Torrey Botany Club* 98:144-150.
- Boyd, C.E. 1971. Phosphorus dynamics in ponds. *Proceedings of the Annual Conference of Southeastern Association of Game and Fisheries Commissioners* 25:418-426.

- Boyd, C.E. 1971. The dynamics of dry matter and chemical substances in a Juncus effusus population. *American Midland Naturalist* 86:28-45.
- Boyd, C.E. and C.P. Goodyear. 1971. The nutritive quality of food in ecological systems. *Archives fur Hydrobiologia* 69:256-270.
- Boyd, C.E. and C.P. Goodyear. 1971. The protein content of some common reptiles and amphibians. *Herpetologica* 27:317-320.
- Boyd, C.E. and C.P. Goodyear. 1971. Somatic and gametic dry matter and protein in gravid females of several amphibian species. *Comparative Biochemistry and Physiology* 40A:771-775.
- Boyd, C.E. and D.H. Vickers. 1971. Variation in the elemental composition of Eichhornia crassipes. *Hydrobiologia* 38:409-414.
- Boyd, C.E. and D.H. Vickers. 1971. Relationships between production, nutrient accumulation, and chlorophyll synthesis in an Eleocharis quadrangulata population. *Canadian Journal of Botany* 49:883-888.
- Lollar, A.Q., D.C. Coleman, and C.E. Boyd. 1971. Carnivorous pathway of phosphorus uptake by Utricularia inflata. *Archives fur Hydrobiologia* 69:400-404.
- Boyd, C.E. 1972. A bibliography of interest in the utilization of vascular aquatic plants. *Economic Botany* 26:74-84.
- Boyd, C.E. 1972. Sources of carbon dioxide for nuisance blooms of algae. *Weed Science* 20:492-497.
- Boyd, C.E. and W.W. Walley. 1972. Production and chemical composition of Saururus cernuus from sites of different fertility. *Ecology* 53:927-932.
- Boyd, C.E. and W.W. Walley. 1972. Studies of the biogeochemistry of boron. I. Concentrations in surface waters, rainfall, and aquatic plants. *American Midland Naturalist* 88:1-14.
- Goodyear, C.P. and C.E. Boyd. 1972. Elemental composition of largemouth bass (Micropterus salmoides). *Transactions of the American Fisheries Society* 101:545-547.
- Polisini, J.M. and C.E. Boyd. 1972. Relationships between cell wall fractions, nitrogen, and standing crop in aquatic macrophytes. *Ecology* 53:484-488.
- Goodyear, C.P., C.E. Boyd, and R.J. Beyers. 1972. Relationships between primary production and mosquitofish (Gambusia affinis) production in large microcosms. *Limnology Oceanography* 17:445-450.
- Boyd, C.E. 1973. Biotic interactions between different species of algae. *Weed Science* 21:32-37.
- Boyd, C.E. 1973. The chemical oxygen demand of waters and biological materials from ponds.

- Transactions of the American Fisheries Society 102:606-611.
- Boyd, C.E. 1973. The amino acid composition of freshwater algae. Archives fur Hydrobiologia 72:1-9.
- Boyd, C.E. 1973. Summer algal communities and primary productivity in fish ponds. Hydrobiologia 41:357-390.
- Boyd, C.E. 1974. The utilization of nitrogen from decomposition of organic matter by cultures of Scenedesmus dimorphus. Archives fur Hydrobiologia 73:361-368.
- Boyd, C.E. 1974. Water quality in catfish ponds. Journal of Marine Science of Alabama 2:19-30.
- Boyd, C.E. and E. Scarsbrook. 1974. Effects of agricultural limestone on phytoplankton communities of fish ponds. Archives fur Hydrobiologia 74:336-349.
- Chiou, C., C.E. Boyd. 1974. The utilization of phosphorus from muds by the phytoplankter Scenedesmus dimorphus and the significance of these findings to the practice of pond fertilization. Hydrobiologia 45:345-355.
- Arce, R.G. and C.E. Boyd. 1975. Effects of agricultural limestone on water chemistry, phytoplankton productivity, and fish production in soft-water ponds. Transactions of the American Fisheries Society 104:308-312.
- Boyd, C.E. and E. Scarsbrook. 1975. Influence of nutrient additions and initial density of plants on production of waterhyacinth, Eichhornia crassipes. Aquatic Botany 1:253-261.
- McVea, C. and C.E. Boyd. 1975. Effects of water hyacinth cover on water chemistry, phytoplankton, and fish in ponds. Journal of Environmental Quality 4:375-378.
- Boyd, C.E., E.E. Prather, and R.W. Parks. 1975. Sudden mortality of massive phytoplankton bloom. Weed Science 23:61-67.
- Boyd, C.E. 1976. Accumulation of dry matter, nitrogen, and phosphorus by cultivated water hyacinths. Economic Botany 30:51-56.
- Boyd, C.E. 1976. Chemical and textural properties of muds from different depths in ponds. Hydrobiologia 48:141-144.
- Boyd, C.E. 1976. Nitrogen fertilizer effects on production of Tilapia in ponds fertilized with phosphorus and potassium. Aquaculture 7:385-390.
- Boyd, C.E. 1976. Water chemistry and plankton in unfertilized ponds in pastures and in woods. Transactions of the American Fisheries Society 105:634-636.
- Dobbins, D.A. and C.E. Boyd. 1976. Phosphorus and potassium fertilization of sunfish ponds. Transactions of the American Fisheries Society 105:536-540.
- Boyd, C.E. 1977. Evaluation of a water analysis kit. Journal of Environmental Quality 6:381-384.

- Boyd, C.E. 1977. Organic matter concentrations and textural properties of muds from different depths in four fish ponds. *Hydrobiologia*. 53:277-279.
- Lichtkoppler, F. and C.E. Boyd. 1977. Phosphorus fertilization of sunfish ponds. *Transactions of the American Fisheries Society* 106:634-636.
- Tucker, C.S. and C.E. Boyd. 1977. Relationships between potassium permanganate treatment and water quality. *Transactions of the American Fisheries Society* 106:481-488.
- Boyd, C.E. 1978. Effluents from catfish ponds during fish harvest. *Journal of Environmental Quality* 7:59-63.
- Almazan, G. and C.E. Boyd. 1978. Effects of nitrogen levels on rates of oxygen consumption during decay of aquatic plants. *Aquatic Botany* 5:119-126.
- Almazan, G. and C.E. Boyd. 1978. Plankton production and tilapia yields in ponds. *Aquaculture* 15:75-77.
- Almazan, G. and C.E. Boyd. 1978. An evaluation of Secchi disk visibility for estimating plankton density in fish ponds. *Hydrobiologia* 61:205-208.
- Boyd, C.E. and J.W. Sowles. 1978. Nitrogen fertilization of ponds. *Transactions of the American Fisheries Society* 107:737-741.
- Tucker, C.S. and C.E. Boyd. 1978. Effects of simazine treatment on channel catfish and bluegill production in ponds. *Aquaculture* 15:345-352.
- Tucker, C.S. and C.E. Boyd. 1978. Consequences of periodic applications of copper sulfate and simazine for phytoplankton control in catfish ponds. *Transactions of the American Fisheries Society* 107:316-320
- Davis, J.A. and C.E. Boyd. 1978. Concentrations of selected elements and ash in bluegill (*Lepomis macrochirus*) and certain other freshwater fish. *Transactions of the American Fisheries Society* 107:862-867.
- Boyd, C.E., J.A. Davis, and E. Johnston. 1978. Die-offs of the blue-green alga, *Anabaena variabilis*, in fish ponds. *Hydrobiologia* 61:129-133.
- Boyd, C.E., J.W. Preacher, and L. Justice. 1978. Hardness, alkalinity, pH, and pond fertilization. *Proceedings of the Annual Conference of Southeastern Association of Game and Fish Commissioners* 107:605-611.
- Boyd, C.E., R.P. Romaine, and E. Johnston. 1978. Predicting early morning dissolved oxygen concentrations in channel catfish ponds. *Transactions of the American Fisheries Society* 107:484-492.
- Romaine, R.P., C.E. Boyd, and W.J. Collis. 1978. Predicting nighttime dissolved oxygen decline

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