

Washington State University

Department of Agronomy and Soils, Pullman, Washington 99164-6420 / 509-335-3475

SEMI-ANNUAL PROGRESS REPORT - JANUARY 31, 1987
FINGERPRINTING OF AZOLLA GERMLASM
GRANT NO. DPE-5542-G-SS-6041-00
PROJECT NO. 6446, 08-29-86 TO 08-28-89
DR. THOMAS A. LUMPKIN, P.I.

Progress on the project was made in three areas:

1. hiring of research staff.
2. development of video-computer system for chromatogram analysis.
3. plan for transfer of Azolla germplasm from IRRI to WSU.

1. HIRING OF RESEARCH STAFF.

During the fall of 1986, little progress was made toward the research goals of the project because of the complicated hiring procedure to fill the associate in research position. This procedure has been completed and an associate in research (Post-Doc) has been hired and will officially begin work on 11 February. The post-doc is William James Zimmerman who has a Ph.D. in biological sciences from the University of Missouri on Stress Ecophysiology of Neotropical Azolla. His vitae is attached.

Dr. Watanabe, the co-P.I. from IRRI, will send one of his technicians, Ben Padre, to work on the project for six months at WSU from March to September 1987.

The grant proposal also includes the hiring of an LDC graduate student. Selection of this graduate student has not been completed. One potential candidate is an Indonesian Ph.D. student currently in the horticulture department at WCU. Her master's degree was on Identification of Potato Chromosomes Using GIEMSA C- Banding Technique from the University of Wisconsin.

2. DEVELOPMENT OF A VIDEO-COMPUTER SYSTEM FOR CHROMATOGRAM ANALYSIS.

During the fall of 1986, BIORAD and other video densitometer equipment were examined for possible use on the project. Based on experience in the department it was decided that a superior video densitometer-statistic analysis system could be developed with the help of Dr. Gaylon Campbell, soil scientist at WSU. Since the system could have many other applications, other projects are contributing to its development in small ways. A video digitalizer computer board for a personal computer is being purchased to make use of an existing video camera to be used for scanning gels.

3. PLAN FOR TRANSFER OF AZOLLA GERMLASM FROM IRRI TO WSU.

Dr. I. Watanabe, Co-P.I. from IRRI and his technician, Ben Padre, will bring about half of the IRRI germplasm collection to WSU in March 1987. By that time, the new post-doc will have prepared a culture environment similar to the system previously used at IRRI to maintain their germplasm collection. Details of IRRI's culture conditions were recorded and sent to WSU. Dr. Watanabe will stay about one week to advise on the analysis procedures and his technician will stay on for six months to help setup the procedures. Their airtravel and per diem will be covered by the project. Country clearance for their travel must be approved via the Project Officer.

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WILLIAM JAMES ZIMMERMAN
Curriculum Vitae

EDUCATION

- PH.D. (1984) Biological Sciences, University of Missouri-Columbia
Advisor--Prof. Charles S. Gowans
Stress ecophysiology of neotropical Azolla
- M.S. (1979) Botany, Washington State University
Advisor--Prof. William R. Rayburn
Cyanobacteria of cultivated and noncultivated soils
- B.A. (1974) Biological Sciences, University of Delaware

HONORS AND AWARDS

- Sigma Xi (1984)
- Conway Curtis Graduate Fellowship (1983-1984)
- Fulbright Fellowship (1979-1980)
- Minority Student Research Award (1978)
- B.A. cum laude (1974)
- Beta Beta Beta (1973-1974)
- Academic Excellence Award (1971)

MAJOR RESEARCH TOPICS

- Strain characterization of nitrogen-fixing cyanobacteria from rice paddies and fields of Colombia, South America (on-going/part-time)
- Nitrogen fixation and ammonia assimilation/excretion in independent Anabaena azollae (1985-1987)
- Mass culture of Anabaena azollae [and other cyanobacteria] (1986-1987)
- Nitrogen fixation, biomass production, and stress ecophysiology in the Azolla-Anabaena symbiosis (1979-1984)
- Beta-carotene production in Dunaliella (Chlorophyta) subjected to water stress (1982-1983)
- Ecology of nitrogen-fixing cyanobacteria of temperate soils (1977-1979)

RESEARCH FUNDING AWARDED

- Whitehall Foundation Grant-in-Aid (1985) Ecophysiological taxonomy of Dunaliella salina (declined due to logistical and time constraints)
- Conway Curtis Fellowship (1983-1984) Ecophysiology of neotropical Azolla

EXPERIENCE

- Postdoctoral researcher (1985-1987)
Excretion of ammonia and nitrogen fixation in Anabaena azollae. Jacob Blaustein Desert Institute, Ben-Gurion University of the Negev, Sede Boqer Campus, Israel.
- Postdoctoral teaching (1984-1985)
Laboratory Instructor/Coordinator-General Botany, Lecturer-General Biology. Washington University, St. Louis, Missouri.
- Research assistant (1978; 1982-1984)
U.S. Department of Agriculture. Study of cell lineages in maize via X-ray-induced mutations. Supervisor--Prof. E. Coe. University of Missouri-Columbia (Summer, 1984).
- Environmental Protection Agency. Preliminary study of the effects of UV-B radiation on seedling growth and anthocyanin induction in maize. Supervisor--Prof. A. Eisenstark. University of Missouri-Columbia (Summer, 1983).
- Ocean Genetics, Inc. Growth and carotenoid production in water-stressed Dunaliella. Supervisors--Profs. C. Gowans and D. Miles. University of Missouri-Columbia (1982-1983).
- Minority Student Research Award. Indigenous heterocystous cyanobacteria of temperate soils. Supervisor--Prof. W. Rayburn. Washington State University (Summer, 1978).
- Teaching assistant (1977-1984)
General Botany, University of Missouri-Columbia
General Ecology, University of Florida
Plant Physiology, University of Florida
General Biology (3 years), Washington State Univ., Univ. Florida
- Tutor (1982-1984)
General Botany Genetics General Zoology General Biology
- Research fellow (1979-1980)
Fulbright Fellowship. Survey and initial physiological characterization of neotropical Azolla from Colombia, South America.
- Soil research technician/agricultural extension agent (1974-1976)
Peace Corps agriculture program-basic grains. Nicaragua, Central America.

PROFESSIONAL SOCIETIES

Sigma Xi

Phycological Society of America

International Phycological Society

ACADEMIC BACKGROUND

Relevant undergraduate coursework:

General Botany
General Microbiology
Cellular & Molecular Biology

General Zoology
Environmental Biology
Struc. & Func. Higher Organisms
General Genetics

General Chemistry (2 sem.)
Organic Chemistry (2 sem.)
General Biochemistry

German (4 sem.)

Graduate coursework:

Plant Physiology
Plant Morphology
Plant Anatomy
Principles Plant Systematics
Synecology

Phycology
Fungal Physiology
Mineral Nutr. & Uptake in Plants
Crop Ecology

Soil Microbiology
Soil Morphology
Soil Fertility

Tropical Soils
Tropical Plant Pathology
Ecosystems of the Tropics

Plant Biochemistry
Chromatography

Intensive Intro. Portuguese

Fluency in foreign languages:

Spanish--very good comprehension, speaking, and reading skills

German--good reading skill (scientific literature)

Portuguese--good reading skill (scientific literature)

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PUBLICATION LIST

- *Zimmerman, W.J. 1979. Selective studies of asymbiotic nitrogen-fixing soil cyanophytes. M.S. Thesis, Washington State University.
- Zimmerman, W., B. Metting, and W. Rayburn. 1980. The occurrence of blue-green algae in silt loams of Whitman County, Washington. *Soil Science* 130 (1): 11-18.
- Zimmerman, W.J. 1982. The occurrence of Azolla in Colombia. *Aquatic Botany* 13: 197-201.
- Zimmerman, W.J. 1983. Growth rate of Azolla in Colombia. *International Rice Research Newsletter* 8 (3): 19-20.
- *Zimmerman, W.J. 1984. An assessment of potential ecotypes of neotropical Azolla. Ph.D. Dissertation, University of Missouri-Columbia.
- Zimmerman, W.J. 1985. Biomass and pigment production in three isolates of Azolla. I. Response to water stress. *Annals of Botany* 56: 689-699.
- Zimmerman, W.J. 1985. Biomass and pigment production in three isolates of Azolla. II. Response to light and temperature stress. *Annals of Botany* 56: 701-709.
- Zimmerman, W.J., and S. Boussiba. 1987. Ammonia assimilation and excretion in an asymbiotic strain of Anabaena azollae from Azolla filiculoides Lam. *Journal of Plant Physiology* (in press).
- Zimmerman, W.J. Growth, nitrogen fixation, and mass culture of isolated Anabaena azollae. (in submission)
- Zimmerman, W.J. Photoproduction and excretion of ammonia in an isolated cyanobiont. (in preparation)

REFEREES

- 74-55-655
✓ PROF. C. S. GOWANS, DIV. BIOL. SCI., UNIV. MISSOURI-COLUMBIA, 110 TUCKER HALL,
COLUMBIA, MO. 65211
- 82-1937
PROF. D. MILES, DIV. BIOL. SCI., UNIV. MISSOURI-COLUMBIA.
- PROF. W. NICHOLS, DEPT. BIOLOGY, WASHINGTON UNIV., ST. LOUIS, MISSOURI. 63130
- DR. AVI GOLAN, BLAUSTEIN DESERT INSTITUTE, BEN-CURION UNIV. OF THE NEGEV,
SEDE BOQUEZ CAMPUS ISRAEL 84990
- DR. DRORA KAPLAN, BLAUSTEIN DESERT INSTITUTE, BEN-CURION UNIV. OF THE NEGEV.
- ✓ PROF. W. RAYBURN, DEPT. BACTERIOLOGY & PUBLIC HEALTH, WASH. STATE UNIV.,
PULLMAN, WA. 99164
- ✓ DR. BLAINE METTING, RIA ^{PLANT} SOLES, INC. HC 32, BOX 1001, PASCO, WA. 99301