Current Research in Herbs

The herb and essential oil research at Delaware State University is the first federally or state-supported project of this kind for the dried product and/or essential oil in the last five decades. It was initiated in 1978 with a grant from the Cooperative State Research Service. Because of this early initiative and our on-going work, we possess a solid basis for developing a centralized research support system by the following criteria.

a. Delaware State University is a source of germplasm for herbs and essential oil plants. We have selected commercially important cultivars for the dozen plants under consideration in our existing research (catnip, lavandin, hardy sweet marjoram, Greek oregano, damask rose, rosemary, saffron, clary sage, Dalmatian sage, savory, French tarragon, and valerian). The selection (or rejection) of these cultivars was based upon botanical/agronomic characteristics (leaf size, flowering size, hardiness, disease resistance) and chemical analysis by gas chromatography/ infrared spectroscopy/ mass spectrometry (GC/IR/MS). We also maintain about 300 clones of *Mentha* (mint), which supplements the mint collection at the national Clonal Germplasm Repository in Corvallis (1/3 of the primary mint germplasm at Corvallis originated from the Project Leader). These herbs were initially gathered from around the world and are always readily distributed to growers in the U.S. In addition, we have collected, propagated, and published on new ethnic herbs from the Asian and Hispanic communities for commercial exploitation.
b. Preliminary agronomic management techniques have been documented for most of the dozen plants: spacing, soil, fertilizers, mulching, and potential pesticides. We have been periodically contacted to advise on growing these herbs from a variety of federal, state, and private organizations, domestically and internationally.
c. We maintain a comprehensive literature file on flavor, fragrance, and medicinal plants encompassing approximately 20,500 reprints backed by approximately 6,700 books and 150,000 bibliographic reference cards. This continually growing collection has been periodically contacted by federal agencies (U.S.D.A.), academia (Oregon State University, Purdue), industry (McCormick; R. J. Reynolds; Rodale Press; Interweave Press; Norfolk Lavender, England; Richter's, Canada; Earthworks; Well Sweep Herb Farm), and private organizations (American Herbal Products Association, American Horticultural Society, Herb Society of America, Herb Research Foundation, International Herb Growers & Marketers Association/International Herb Association) to provide information.
d. We have published widely on flavor, fragrance, and medicinal plants, often co-authoring with scientists from academia (Rutgers University, Arizona State University, Baylor University), botanic gardens (Longwood Gardens; Jardin Botanico Nacional, Santo Domingo, Dominican Republic), private groups (Ozark Resources Center), and industry (R. J. Reynolds Tobacco Co., Earthworks). This information has been disseminated in the form of meetings (scientists, growers, and marketers), scientific publications, popular publications, book chapters, and conference proceedings (for published information, see list of publications).
e. We are considered national experts in the identification of herbs. We thus do taxonomic consulting work with the major importers of herbs and spices (e.g., Baltimore Spice, McCormick, Lebermuth, Tone Brothers) and herb research foundations (American Herbal Products Association, Herb Research Foundation). Our research complements the Claude E. Phillips Herbarium at DSU, which contains approximately 110,000 specimens. This is considered a larger medium-sized herbarium by national standards (87th out of 525 herbaria in the US) and the largest herbarium at an HBCU. It is particularly rich in European, Asiatic, and American specimens from the Lamiaceae and Apiaceae.
f. We have established the methodologies for essential oil analysis by GC/MS, backed by a computerized matching library of our own creation. We have cooperated with academia (Oregon State University, Baylor University, Cornell University, University of Gronigen) and industry (Crompton & Knowles, Laurent) in establishing this database and trading information. Our existing Hewlett-Packard 5980 gas chromatograph/5970 mass spectrometer has handled most of our work for documentation of the quality and quantity of both the dried product and essential oils.
g. We have developed both electrically and solar heated pilot dryers to handle up to a few acres.
h. DSU and Southern university are the only HBCU's to have sponsored an international conference in this area (International Herb Growers & Marketers Conference/Internation Herb Association).
i. DSU, in cooperation with the University of Delaware, has organized a Delaware Herb Growers and Marketers Association.
j. The Project Leader is on the editorial board for the Journal of Essential Oil Research, Economic Botany, and Herbs for

Health.

k. The Project Leader is on the review panel for the American Herbal Products Association (AHPA), the Advisory Board of the American Botanical Council (ABC), the Scientific Panel and Program Committee of the International Herb Association (IHA), and Botany and Horticulture Committee of The Herb Society of America (HSA).
l. The expertise of the Project Leader in flavor, fragrance, and medicinal plants has been recognized by the first faculty research achievement award at DSU in 1988, the Helen de Conway Little Medal of Honor from the HSA in 1990, the Otto Richter Memorial Lecture Award from IHGMA in 1993, the R. D. Morrison and F. E. Evans Outstanding Scientist Award from the Association of Research Directors in 1994, Distinguished Research Award from National Association for Equal Opportunity in Higher Education (NAFEO) in 1994, Scientific Award from the American Horticulture Society (AHS) in 1996, and the Industry Achievement Award from Texas Herb Growers and Marketers Association (THGMA) in 1996.
m. We have established tissue cultures of both Mentha and Salvia to investigate somaclonal variation and somatic fusion to create new flavors and fragrances. This has been accomplished with graduate students through the Department of Biology at DSU.
n. Delaware State University is in close geographical proximity to the National Herb Garden at the US National Arboretum. The National Arboretum is exactly two hours from DSU, so we have worked with both the former curator, Ms. Holly Shimizu, and the present curator, Ms. Janet Walker.

Future Plans for Research in Herbs at Delaware State University

We see the need for our research on herbs and essential oils at Delaware State University to expand into the following areas to strengthen our goal of developing an agricultural industry in Delaware.

a. We are currently constructing a demonstration area in conjunction with the aquaculture research group directed by Dr. Bernard Petrosky. This area will encompass demonstration plots, driers, etc. for public education.
b. While we have sought economically important natural chemicals from various sources (Florasynth, Commodity Services International, Aromatics Inc., Freshworld of DuPont), we think that a consortium of academia and industry would allow us to better assess the needs of the marketplace. A consortium is being developed with the University of Mississippi and C.S.R.S. for natural products; affiliation would greatly benefit our research.
c. While we have emphasized flavor and fragrance plants, expansion into some medicinals may be advantageous at this time in view of the changing federal legislation and marketplace trends.
d. We rely upon our own subjective evaluation of public needs of research, but we think that we need more public input, which in turn would engender greater public support.

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