

anthocyanins, and ORAC followed by juice and wine samples. Overall, Apache berries had higher concentrations of phenolics, anthocyanins and higher ORAC values than Ouachita. For both cultivars, blackberries from Arkansas had lower concentrations of phenolics and anthocyanins as well as lower ORAC values than blackberries grown in Oklahoma.

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### **(092) Seed Germination of *Myrica nana* Cheval**

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*Myrica nana* Cheval, an evergreen shrub, belongs to Myricaceae. It is a species with narrow geographical range and endemic to Yunnan, Western Guizhou and Chaou (Tibet) in China. The germination rates of *M. nana* are normally low under natural conditions, resulting in the losing of *M. nana* germplasm resources and habitat. To improve the seed germination, *M. nana* seeds were stratified at cold for 3–30 months under clay and sand. The results showed that at least 180–days of cold stratification was required. The germination rate reached the highest at 60.8% after 240-day stratification, then decreased slowly until 2.5 years when the seed completely lost its viability. Media for stratifications also played an important role for seed germination. Seeds under the clay had only 26.0% germination while 48.5% under the sand. Humidity significantly affected the seed germination and the highest germination rate of 52.5% was obtained under 26.24% humidity. Higher or lower humidity decreased the seed germination. Temperature was also a major factor that influenced the seed germination and the germination rate reached the highest at 35.5% under 8 °C. Seed germination of *M. nana* could be significantly increased if stratifying properly and further investigation should be conducted to achieve higher germination rates.

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### **(093) The Grape Doctor—A Vineyard Problem Diagnosis Tool**

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Identification of the cause of vineyard problems, especially those that are non-routine, often can be difficult and may require

expert consultation with Extension specialists or crop consultants. Frequently, grape problems are time-sensitive and a rapid diagnosis is desired so that appropriate corrective actions can be quickly taken. The Grape Doctor is the first of its kind web-based interactive grape problem diagnosis tool. It is a featured resource of the eXtension Grape Community of Practice and can be accessed at <<http://www.extension.org/grapes>>. The Grape Doctor uses a symptom-based diagnostic approach corresponding to the perspective of a grower observing an unknown problem in the vineyard. A series of illustrated menus progressively guides the diagnosis through selection of the problematic part of the vine (e.g., leaves), characterizing the problem (e.g., leaf spots), and describing the symptoms (e.g., size, shape, color, location of spots). Diagnostic results are presented as an illustrated list of potential causes of the problem, ranked by probability (high, medium, low). Problem names are hyperlinked to a Problem Profile page that provides additional information to assist the diagnosis. Problem Profiles contain photos and narrative descriptions of: primary symptoms or signs, secondary or occasional symptoms or signs, patterns of occurrence, occurrence in the U.S., associated risk factors, problems with similar symptoms or signs, and additional actions to assist the diagnosis. A database was constructed of problems associated with grape production in the United States, including diseases, insects, other pests, nutritional deficiencies and toxicities, physiological disorders, weather related injuries, herbicide and chemical phytotoxicity, etc. Members of the eXtension Grape Community of Practice contributed their expertise in viticulture, plant pathology, entomology and other related disciplines to contribute, review and edit database items for technical accuracy. The Grape Doctor currently has more than 150 grape problems in its database. A smartphone application is under development to facilitate real-time problem diagnosis in the field.

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### **(094) DMDS in Combination with Reduced Rates of Chloropicrin for Sustainable Strawberry Production and Soilborne Pathogens Control in California**

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With the challenges strawberry growers face in the process of replacing methyl bromide (MeBr) while maintaining yield threshold, dimethyl disulfide (DMDS) with its zero Ozone Depletion Potential (ODP) appears to be a promising solution. Dimethyl disulfide DMDS is a yellow solution with strong garlic-like odor. Field experiments were conducted for the growing season of 2009-2010 in Watsonville and Salinas, CA to investigate the efficacy of DMDS with reduced rates of chloropicrin on strawberry yield, soilborne pathogens, and major resident weeds. Chloropicrin treatments were drip applied with and without sequential application of different rates of DMDS. Beds were tarped with virtually impermeable