United States Department of Agriculture

NRCS Natural Resources Conservation Service

Plant Materials Program

Year 2001
Lockeford Plant Materials Center
Progress Report of Activities

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The California plant materials program and the Lockeford Plant Materials Center (PMC) provide plant science support to the USDA - NRCS California Field Offices. The California Plant Materials Center in Lockeford collects promising plants and tests their performance under a variety of soil, climatic and use conditions. Over the past fifty years, 29 plants have been released for commercial seed production to solve soil and water conservation problems. Most of the following new studies were requested from NRCS field office staff as part of the FY 2001 requests for NRCS state office assistance. NRCS field office staff worked closely with Dave Dyer, PMC Manager, in developing these studies and in some locations they took the lead. Many landowners helped with site preparation, plot lay out, fencing, planting and application of treatment materials and management treatments. Also, due to NRCS field office and Lockeford PMC staff networking efforts, many NRCS partners and Conservation Districts helped make these studies happen.

PMC grass waterway planted with four native grasses

'Lana' Vetch used to control Medusahead

Technical Note 65 - Vegetative Control of Medusahead. This study broadcast seeded Lana vetch at three different seeding rates 12, 16, and 20 pounds pure live seed per acre and had four replications. Superphosphate 0-20-0 was applied at a rate of 400 pounds per acre. The study cooperators were the Red Bluff and Jackson NRCS field office staff, East Bay MUD and Camanche Hills Hunting Preserve. Where 'Lana' vetch is well adapted, it may be successfully broadcast seeded and used to control Medusahead in combination with applications of phosphate fertilizer. Phosphate fertilizer must be applied each year to maintain a high level of 'Lana' vetch ground cover. The optimum seeding rate for 'Lana' vetch is 20 PLS pounds per acre for vegetative control of Medusahead.

Evaluation of selected plant materials for uptake of nitrogen and phosphorus after pasture manure application. Perla koleagrass, Tonic plantain and Teton tall fescue were planted in a pasture area with three replications and three treatments: manure, standard fertilizer and no application. Mississippi PMC will do the N and P laboratory work. The study cooperators are the Petaluma NRCSfield office and rancher Gary Mahrt.

Soil sequestration of carbon and biomass-to-ethanol CFTs. The Woodland and Red Bluff field offices and area office staff are working with the PMC, universities, and USDA-ARS to determine native and introduced grass carbon sequestration levels and their potential for ethanol production.

Obtaining soil and root carbon samples, a job for the scientist who likes hard field work

Templeton rangeland seeding trial. Range conservationist Karl Striby along with the local cooperative extension staff have the lead on this seeding trail study which evaluated four seed mixes which were replicated three times and have different grazing intensities. Sixteen single species were seeded with three replications. Some of the rangeland plants being used are blue wildrye, hard fescue, hardinggrass, Perla grass, slender wheatgrass, orchardgrass, and bur and barrel medics, sub. and Persian clovers. The moderate grazing treatment appears to render the highest number of seedlings per square foot. The orchardgrass has produced the most seedlings, far ahead of the other species.

Nesella pulchra genetic analysis. PMC staff assisted the San Francisco urban office and USDA-ARS by doing seed collection inventory, documentation, shipping, and interpretation of genetic analysis report. The goal is to determine the level of genetic variation of purple needle grass in the San Francisco bay area. A paper, **"Mode of reproduction and amplified fragment length polymorphism variation in purple needlegrass (Nassella pulchra): utilization of natural germplasm sources",** was developed and published in the British Journal of Molecular Ecology and also released as plant materials technical note 64. LK315d purple needlegrass was determined to have a high level of genetic diversity and would be very appropriate for use in the eastern bay area and close enough to San Francisco populations to be considered for use in the western bay area.

Technical Note 62 - Soil quality improvement using mycorrhizae inoculation and its effects on the propagation of California native plants. This study used endo net arbuscular mycorrhizal innoculum Glomus intraradices at three different rates .9 gram, 1.8 gram and 2.7 gram per gallon container. The mycorrhizal inoculum was successful in increasing California native plant vigor, growth height and drought tolerance. 'Duro' California buckwheat had excellent vigor with the 1.8 gram treatment, 'Rio' beardless wildrye with 2.7 gram treatment showed excellent vigor and 17.78 cm more height than the control and LK115d Purple Needle Grass with the 2.7 gram treatment also showed excellent vigor and 7.62 cm more height than the control. Mycorrhizal innoculum has the potential to increase California native plant competition and establishment over invasive and non-native plant species.

Technical Note 63 - Soil Quality improvement using worm castings and its effects on propagation of conservation plants. This study used different amounts of worm castings, (1/3 of soil mix, 2/3 of soil mix, and all worm castings), in the propagation soil mix used to propagate California native plants. 'Duro' California buckwheat exhibited excellent growth at the 2/3-worm casting treatment level. 'Rio' beardless wildrye showed excellent growth when

all worm castings were used. LK115d Purple Needle Grass presented gradual growth increases with increasing quantities of worm castings and the all worm castings treatment demonstrated good performance when compared to the control. Vermaculture worm castings were successful in increasing California native plant growth in a greenhouse setting. These evaluations show potential for the increased use of worm castings in sustainable agriculture.

'Mariposa' blue wildrye was approved for release by the California Crop Improvement Association. 'Mariposa' was not bred but selected for its overall performance and uniformity. It has been evaluated for foliage size, abundance and uniformity; vigor; resistance to disease and drought. The variety can be distinguished from other populations tested by its combination of (1) greater foliage size and abundance, (2) excellent vigor, (3) excellent resistance to disease, (4) excellent resistance to drought, (5) good seed amount and fill. 'Mariposa' maintains a good vigor for the first four years and ranks high in terms of foliage appearance (primarily less leaf rust). The variety is dormant in the late summer (July to mid-October).

LK 517f Germplasm Saltgrass was approved for release by the California Crop Improvement Association. LK 517f was collected form a native stand near Pixley, California and it was evaluated in a common garden at the Lockeford PMC against 70 other populations. LK 517f is a coarse-leafed warm season California native perennial grass with extensive creeping rhizomes, which form large colonies. Establishment should be in the late spring using rhizomes or plugs planted on one-foot centers and irrigation water should be applied the first summer to ensure stand establishment. LK 517f is used for riparian restoration and bank and shoreline stabilization.

Plant Materials Program website. If you are looking for information on vegetative solutions to conservation problems or would like copies of the Lockeford PMC technical notes, please go to the Plant Materials Program website at: http://Plant-Materials.nrcs.usda.gov/

PMC Conservation Plan Update

PMC backyard conservation demonstration area

Eighteen NRCS conservation planers completed their training by developing a new conservation plan for the PMC in 1999. Sixteen acres in fields four and six had a subsoiling treatment to three feet followed by land smoothing; the cost was $5,000. A 200-foot hedgerow was planted along the east fence line. The fence had to be replaced and repaired in places which cost $2,200. The grassed waterway had culverts cleaned out at a cost of $1,200, survey design completed, final grading completed at a cost of $15,000 and the waterway was seeded with four native grasses. Eight acres of clover cover crop was planted. Air management products were placed on all dirt farm roads. The Boy Scouts installed 20 wood duck boxes along the river. The Stream Team, the Wetland Team and Stockton field office staffs assisted with practice design for wildlife habitat, native tree and shrub establishment, Himalayan blackberry control and steam bank protection. Goats are now being used for Himalayan blackberry control along the river. The backyard conservation program demonstration area was installed at a cost of $5,000. To all that have helped with this effort, Thanks!

Goats being used to remove invasive species along the PMC levee

PMC Open House

Mark your calendar for the PMC open house on June 19th, starting at 9:30 AM. Use of goats for invasive plant control, new PMC studies, cover crop demonstrations and vegetative guides will be some of the agenda items.

National new employee orientation training at the PMC

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