



BIOCHAR R&D
at
Butte College, Oroville, Ca.
2011- 2019
and
APPLICATIONS SINCE

Sponsors:

SCDI MESA EPA -P3 PG&E BCFSC

What can we do about all this waste?

We are drowning in biomass waste in California!



It's not a new problem, but the Camp Fire made it acute!

BIOCHAR R&D at Butte College

EPA-P-3 Phase I & II 2017 - 2020

Objective:

- Introduce students to hands-on applied R&D in biochar production, characterization, application and advocacy.**

Tasks:

- ❑ Develop capabilities for biochar basic characterization testing at Butte College, based on Dr. Hugh McLaughlin's *Basic Biochar Metrics (Version X, Nov. 2017)*;**
- ❑ Design and conduct greenhouse and small-scale field experiments to study the effects of biochar on soil moisture retention and effects on plant growth;**
- ❑ Design and conduct large-scale field experiments for demonstrating agricultural applications of biochar ;**
- ❑ Develop on-site biochar production through flame-cap pile and container burning – Berkeley Olive Grove experiments.**
- ❑ Then the Camp Fire struck and our focus turned to **BIOCHAR IN THE FOREST** made on-site from waste wood and we met Kelpie Wilson!!!**

BIOCHAR R&D PROJECT at Butte College 2011 to 2018



Biomass Pyrolysis = Biochar



Thermal Energy Measurements



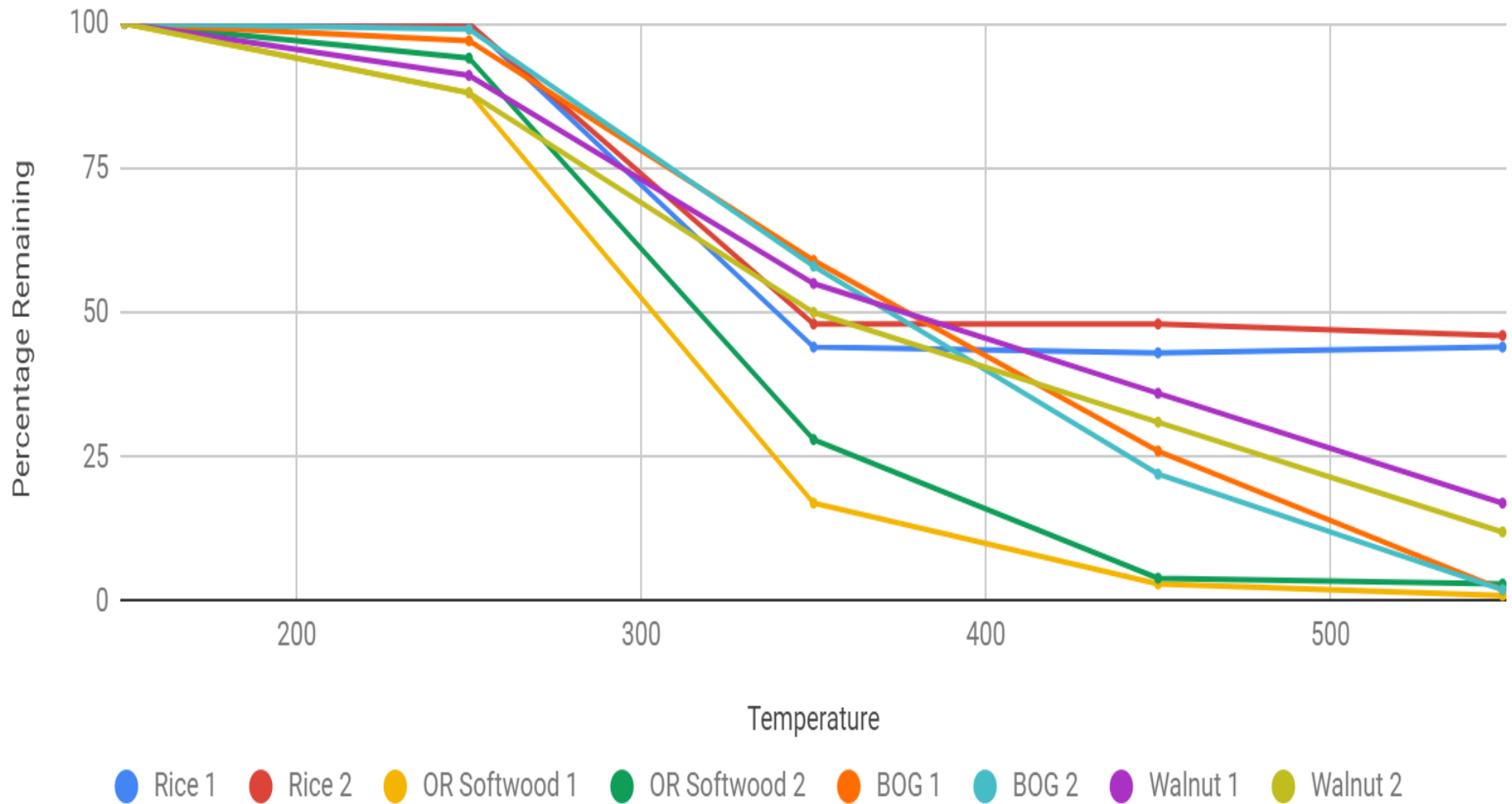
**EPA-P3 National Exhibit in WDC
Phase II Grant Award**



**BIOCHAR R&D Laboratory
Dr. Hugh McLaughlin's BBM**

Most Significant Biochar Lab Results

Mass Percent Remaining vs Temperature



BIOCHAR R&D PROJECT at Butte College 2018-19 GREENHOUSE EXPERIEMENTS

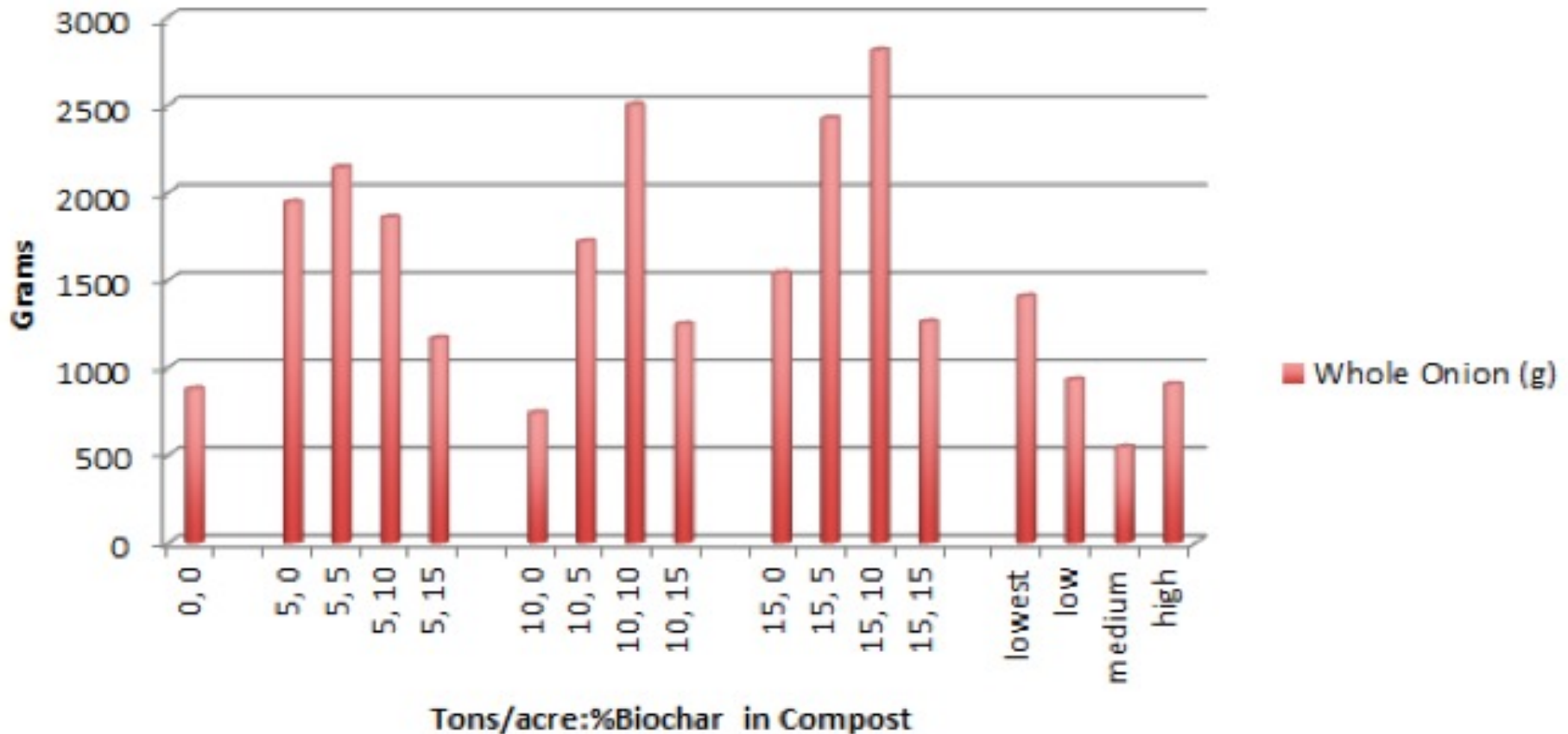


BIOCHAR R&D PROJECT at Butte College Agricultural Field Experiments



Our first hand experience at MGO Farm Clark Road, Oroville, CA

Harvest Weight by increasing tonnage compost & % Biochar



Ref: 190802 DRAFT Summer 2019 BIOCHAAR R&D Intern's Report, EPA-P3 Grant, Butte College, Oroville, CA.

**EARLY ON-SITE BIOCHAR PRODUCTION
EXPERIMENTS
FLAME TOP BURNS AT BOG
2017-18**



CONSERVATION PILE BURN



CONTAINED BURN

ON-SITE-BIOCHAR-PRODUCTION WORKSHOP PREPARATIONS & BURN IN CONCOW Summer of 2019

January 2020



Pile building



Shielded kiln burning

ON-SITE-BIOCHAR-PRODUCTION DEMO

Feher Property in Paradise

February 1, 2020



Top-lighting Oregon kiln with kindling



Oregon kiln burning with no smoke

BIOCHAR IN THE WOODS WORKSHOP BY KELPIE WILSON – CHICO/MAGALIA, CA. February 1-2, 2022



**FUEL REDUCTION SITE CLEAN UP
NOBLE PARK in PARADISE, CA.
BIOCHAR COALITION & CFRP
December 3-4, 2022**



BIOCHAR-BURN FUEL REDUCTION DEMO
BCFSC & BIOCHAR COALITION
Morgan Ridge, South of Paradise, California
February 18, 2023

