

rating beardless wheatgrass seed by size. But planting depth definitely influences emergence of any size of seed.

LITERATURE CITED

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AN INEXPENSIVE DRYING OVEN FOR RANGE FORAGE SAMPLES

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Range and game managers and researchers located at small outlying stations may periodically be required to collect and process samples of forage—a job which is greatly facilitated by the use of a drying oven. Such a situation at Prescott led to the development of an inexpensive but dependable homemade drying oven.

In 1958 the writer embarked upon a long-term proper-use experiment involving the clipping of a large number of chaparral shrubs (Arizona Federal Aid Project W-78-R;WP5,J4). The clipping was carried out in October each year and involved the processing of over two hundred samples. Neither storage space for air-drying nor a regular laboratory drying oven was available. After some investigation and experimenting an oven was built (Figure 1).

The case for the oven was a 7.5 cubic-foot refrigerator box bought at a junkyard with motor, condenser, and coils removed. The heat source was a 1000-watt ten-amp. coil of the type designed for house-trailer hot-water heaters. Heat regulation was provided by a Fenwal differential expansion thermostat. The coil was placed on



FIGURE 1. The drying oven interior showing coil, steel plate, thermostat and racks.

the floor of the box and wired in series to the thermostat, which was inserted through the wall of the box about half-way up one side. A $\frac{3}{8}$ -inch steel plate

was fitted into the bottom of the box about four inches above the coil to promote even heat distribution. The only ventilation was provided by the cracks around

Table 1. Drying oven efficiency test of 72 hours duration on current annual growth twigs of shrubs.

	Total		First 24 Hours		Second 24 Hours		Third 24 Hours	
	Green Weight	Weight Lost	Weight Lost	Percent of Total	Weight Lost	Percent of Total	Weight Lost	Percent of Total
	(Grams)	(Grams)	(Grams)	Loss	(Grams)	Loss	(Grams)	Loss
Desert Ceanothus (<i>Ceanothus greggii</i>)								
335.8	147.6	145.3	98.44	1.7	1.15	0.6	0.41	
Cliff-rose (<i>Cowania stansburiana</i>)								
170.0	89.4	88.0	98.43	1.0	1.12	0.4	0.45	
82.4	45.7	45.1	98.69	0.3	0.66	0.3	0.66	
107.5	57.5	56.9	98.96	0.4	0.70	0.2	0.35	
127.8	70.3	69.5	98.86	0.6	0.85	0.2	0.28	

the door and a small hole at the top rear where the coolant tubes entered the box. Entire cost of the completed oven was about \$40.

The oven has been in operation for about five weeks each year for the past five years without serious maintenance problems. Placed outside in a carport in October with daily minimum temperatures as low as 26° F. the oven required about six kilowatts of electricity per day.

Results of the first small-scale

efficiency test were so completely satisfactory that no further tests were conducted. As shown in Table 1, a 24-hour period of drying at 105° C. was sufficient to extract over 98 percent of the moisture content of the twigs. As a result of this test, plans to provide forced-draft ventilation were dropped and the oven was left in its simplest form. Throughout the browse clipping experiments a 48-hour drying period has been employed, insuring removal of over 99 percent

of the moisture content of the twig samples.

Many old refrigerator boxes, including the one shown here, are insulated with corrugated cardboard. The normal operating temperature of the oven is well below the charring temperature of cardboard, but a thermostat malfunction or wiring short possibly could cause a fire. A box with fiberglass insulation would be safer, but cardboard is acceptable if suitable precautions are taken against fire.