

5. A GAS DRIER FOR FIELD DRYING OF PLANT SPECIMENS

The use of a portable specimen drier can overcome the necessity for changing drying paper either when plant specimens are too moist for drying in a drier-transporter (Panagos & Westfall 1989b) or when working in very humid conditions. Characteristics of a portable specimen drier should include: (a) robust construction; (b) efficient drying; (c) suitability for drying specimens in plant presses; (d) simple and inexpensive construction; and (e) independence of electrical power. These characteristics exclude specimen driers such as that described by Botha

& Coetzee (1976), in which gas lamps are used as heat sources, because of the fragility of the mantles. Furthermore, aluminium construction is expensive in terms of both material and labour.

In designing a portable specimen drier, maximum use was made of commercially available apparatus in order to reduce material and labour costs. A Cadac Skottelskaar Braai forms the basic unit. Modification simply entails the following:



FIGURE 9. — Specimen drier showing (a) press support unit, (b) burner pan, (c) stem, (d) gas cylinder stabilizers, (e) 2,8 kg gas cylinder and (f) retaining clip handles wedged on the gas cylinder.

- 1, removing the cooking dish;
- 2, reducing the stem to an overall length of 155 mm (excluding jet protrusion) by cutting, for stability;
- 3, replacing the standard jet with a Cadac no. 31 (0,12 mm) jet for heat reduction;
- 4, placing rubber tubing over the retaining clip handles so that the handles can be wedged against the gas cylinder for extra stability; and
- 5, drilling five 11 mm diameter holes in the base of the burner pan in the same contour as the three existing holes for increased airflow.

Air heating, press support and flame deflection are provided by a simple unit placed on the burner pan for supporting the press.

This unit consists of a flat expanded metal grid 520 mm in diameter with the following specifications: 2,5 mm strand width; 1,6 mm strand thickness; mass 9,1 kg m⁻²; and 21% opening. The grid serves to heat the air and also prevents gas ignition on the upper side of the grid, as in a Davy lamp. A ring of 10 mm diameter rod is brazed on the upper side of the grid around the circumference, to provide a smooth edge and increase rigidity.

The plant press is supported by a 370 × 370 mm square of 10 mm diameter rod. Four struts, also of 10 mm diameter rod, are brazed to the corners of the square and to the grid circumference rod, to support the plant press 105 mm above the grid.

To prevent the grid centre from overheating, the flame is deflected by a 55 mm deep, lipped cone and a 6 mm thick plate both of fibre-reinforced cement and with a diameter of 275 mm. These are bolted to the underside of the grid. A fibre-reinforced cement ashtray lid is suitable for the cone and can withstand temperatures of up to about 200°C.

A 550 × 1960 mm canvas skirt, with eyes at 100 mm intervals along the edge of one side for threading a securing cord, channels air through the grid and press.

The assembled field drier mounted on a 2,8 kg gas cylinder is shown in Figure 9. Assembly entails screwing the stem into the gas cylinder and placing the burner pan onto the stem and the press support unit onto the burner pan. The retaining clip handles are then wedged onto the cylinder. The cylinder can be stabilized by the addition of gas cylinder stabilizers as shown in Figure 9. Calculations indicate a burning time in excess of 120 hours with a 2,8 kg gas cylinder as shown in Figure 9.

After lighting through the large burner pan holes and adjusting the flame to a low setting, the plant press is placed with the long side on the press support unit in such a way that the hot air can rise through the plant press cardboard ventilators and between the drying papers. The canvas skirt is wrapped around the press and secured with the cord as shown in Figure 10. Some excess hot air should be able to pass between the press and skirt to prevent overheating.



FIGURE 10. — Specimen drier with plant press showing the canvas skirt wrapped around the plant press.

After use a plastic cap should be placed over the jet and a plug inserted into the open end of the stems, to prevent jet clogging. The components can then be wrapped in the canvas skirt for transportation.

The specimen drier is robust, extremely efficient, simple to construct and easy to transport.

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REFERENCES

- BOTHA, D.J. & COETZEE, J. 1976. A portable drier for plant specimens. *Journal of South African Botany* 42: 41-44.
- PANAGOS, M.D. & WESTFALL, R.H. 1989b. Plant collecting apparatus for taxonomic and ecological studies. 4. Drier-transporters for plant presses. *Bothalia* 19: 269-270.

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