

Low-cost manual equipment for sampling the soil profile

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Simple field methodology is needed to monitor the sustainability of farming systems. Deep below-ground evaluations include nutrient and water retention, rooting depth, soil biota and the status of soil acidity and salinity. Portable, durable and low-cost equipment is described which can effectively sample soil profiles or install access tubes to 2 m. Apart from the jack, the apparatus is not available commercially. Cost of material for other items (1995) is \$80.

Design and operation

Components of the equipment are shown in Figure 1 along with their design features. The insertion of a RALLOY compression plug (15 mm) into the machined steel cap (A) provides an effective way of absorbing the impact of a 3 kg hammer used for striking the cap and imposes a concentrated force on the corer which is more effective than hydraulic methods. The cap assembly (A) impacts on a spacer plug (B) that prevents distortion of the reinforced top of the corer. Items A and B are used with a conventional steel corer (C) with a cutting edge formed for specific tasks. We use a standard corer (40 mm diameter, length 1.0 m) which can be used as the first stage for inserting a 2 m corer where required. In dry or difficult soil, hammer handles of wood or fibre glass can shatter. Durable handles can be made with thick-walled pipe pressed through the head, flared (not welded) and covered with a 5 mm rubber grip to absorb jarring.

After the corer has been driven into the soil, the base plate is fitted over the protruding corer, using the base plate locating sleeve for alignment. The pin is then inserted through one link in the lifting chain and the jacking operation commenced. For the PVC corer, good soil conditions are essential to

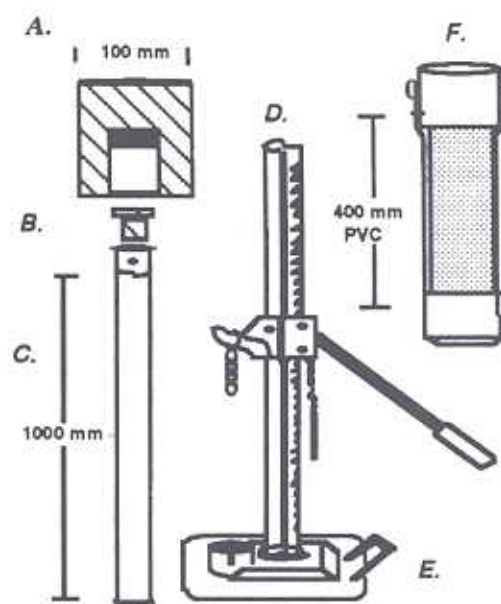


Figure 1. A: steel cap with RALLOY (Cadillac Plastics, Cardiff, NSW 2285) insert (black); B: steel spacer plug fits inside the reinforced corer top and interfaces with the RALLOY; C: standard steel corer with a cutting tip that can be varied to suit the purpose (contact authors); D: ratchet jack (bumper type" or JACKALL [T.J.M., Auburn, NSW 2144]) fitted to enlarged base plate (E) with a circular hole to accommodate the pin and the lifting chain which are fitted into the reinforced top of an inserted corer. F: a PVC corer (90 mm diameter) can be used when less disturbed samples are required. It is recessed into a steel cap and a steel cutting base, attached to the two steel straps that fit over lugs at the bottom of the cap. This corer requires an enlarged based plate hole and for lifting, the jack is fitted with two chains that are hooked into rings welded to the top of the cap.

avoid shattering; cores have been successfully taken to 30 cm and can be removed easily without digging.