

Successful transport and quarantine of materials using sealable plastic barrels, Round Island, Mauritius

Tatayaha R.V.V., Birch D., Haverson P., Khadun A. & Zuel N.

Mauritian Wildlife Foundation, Grannum Road, Vacoas, Mauritius, Indian Ocean

SUMMARY

A practical, cost-effective method of packing securely items destined for Round Island was required. Since 2001, re-sealable plastic barrels have been used for the transport of almost all materials onto the island. No unwanted 'stowaway' species have since been recorded when using this method of packing. The barrels are very versatile and are increasingly used in the transport of materials to other Mauritian offshore islets.

BACKGROUND

Round Island is Mauritius' second largest offshore islet. It is one of the few relatively large oceanic islands in the tropics free of introduced mammals. Alien vertebrates are now restricted to house sparrows *Passer domesticus* and zebra doves *Geopelia striata*. The island supports the last remnant of a lowland palm-rich community that formerly covered dry lowland areas of Mauritius, and comprises several species of endemic palms. The island also harbours populations of other important plants e.g. the Round Island population of screwpine (Vacoas) *Pandanus vandermeeschii*, is the largest remaining of this species.

Unlike the main island of Mauritius, Round Island has largely intact reptile and bird communities; it supports 7-8 species of reptile all endemic to Mauritius, and is internationally important for its seabird colonies. It has the only Indian Ocean breeding colony of Trindade petrel *Pterodroma arminjoniana* and has the largest populations of wedge-tailed shearwater *Puffinus pacificus* and red-tailed tropicbird *Phaeton rubricauda* in the Mascarenes.

The risk of introducing alien vertebrates, particularly house geckos (e.g. *Hemidactylus frenatus* and *Gehyra mutilata*) and small rodents, and also invasive weeds and insects is a growing concern especially now the island is permanently manned and transfers of material and personnel to the island have increased significantly since 2000. The numbers of introduced insect species is thought to be low,

although cockroaches (Blattellidae) and ants (Formicidae) have been inadvertently introduced in the past, despite strict quarantine measures when importing materials. Therefore a practical and safe method of transporting materials to the island was required.

ACTION

Study site: Round Island (19°54'03''S, 57°47'03''E) in the Indian Ocean is Mauritius' second largest offshore islet (219 ha), and is situated 22.5 km off its north-east coast. It is a crescent-shaped volcanic island rising to 280 m above sea level. Its slopes are generally steep, particularly on the upper third of the island. Over half of the island is covered in bare rock.

Round Island was declared a Nature Reserve in 1957 in order to give legal protection on account of the threatened endemic species it harbours and the immense anthropogenic pressures that it was then subject to. The fauna and flora was under threat, amongst other factors, as a result of over 150 years of severe habitat modification by the activities of introduced European rabbits *Oryctolagus cuniculus* and goats *Capra hircus*. The eradication of goats in 1979 and rabbits in 1986 is considered to have saved much of the remaining biota and has facilitated restoration of the island to a condition more like that of the nineteenth century. It is administered jointly by the National Parks and Conservation Service (NPCS) of the Government of Mauritius and the Mauritian Wildlife Foundation (MWF).

Access to Round Island by boat is very difficult as it has a completely rocky shoreline and the sea is usually very rough. There is one main landing rock where, during calm sea conditions, small inflatable boats can approach to unload equipment and personnel. The only reliably safe and easy access to the island is by helicopter.

So far rodents, house geckos, insect pests and major woody weeds have not reached Round Island, probably due to the large distance that separates the island from mainland Mauritius and difficult access. However, their introduction to the island is a real possibility if precautions during visits to the island are not adequately taken. The biodiversity of the island is very vulnerable to any alien species introduction. Rodents, in particular rats *Rattus* spp., could decimate reptile, bird and plant populations - as has been the case on mainland Mauritius and other islets. The survival of the reptile community is particularly dependent on the absence of such predators.

Earlier transport techniques: Previously, carton boxes that were tied with string and sealed with packing tape were used to carry equipment to and from Round Island, or items were sealed in plastic bin-liners. The boxes were however prone to water damage and liners to tearing. These methods were far from being fool-proof; for example, cockroaches were inadvertently introduced in this way in the late 1980s or early 1990s. With the increased flux of conservation personnel and equipment to the island, the ever present need for stringent and effective quarantine became paramount.

Plastic barrels: The use of sealable crates was strongly recommended by the first Round Island Management Plan in 1989. The crate had to be quarantine safe, tough and durable, cheap, and of convenient size so that it could take an acceptable volume and weight, but not too bulky. However, no suitable solutions were found until plastic barrels were tried out in 2001. These barrels had been used to transport a chemical softening agent (imported from China) used in the Mauritian jean manufacturing industry. Once emptied of their contents, thousands of these barrels are discarded annually, donated or sold on the market for a low price of Rupees 40 (GBP 0.75) each. There are very few alternative uses for these barrels, and shipping back to the suppliers is not an economic option. These blue (occasionally white) barrels with a black, round screw top plastic lid, were available in a

number of sizes from 50 to 200 l capacity. Importantly they were made of tough, thick, durable plastic.

During trials the barrels were found to be water tight when sealed and could be dropped into the sea during boat transfers without affecting the contents; full advantage is made of this when transporting materials in barrels by boat. The drums float, reducing chances of loss of any that fall overboard during unloading. The plastic material is tough and hard wearing, and can be used for several years. Furthermore, the drums can easily contain up to 50 kg in weight or more. Two collapsible and two sunk-in ergonomic side handles facilitate transport, weighing, and securing during transport. As they come in standard sizes this allows exact determination of volumes to be sent by boat and helicopter. Their design allows them to be easily stacked in a variety of ways. In addition, they are very cheap compared to other less performing boxes evaluated, at Rupees 2000 (=US\$ 65) each.

CONSEQUENCES

To date, no incursions of alien species are known to have occurred through the use of the blue barrels as quarantine crates. The use of the barrels provides a durable and reliable solution for quarantine. The absence of holes and the ability to close them securely greatly reduces the chance of alien species reaching Round Island, and also to other islands and islets where they are now used.

It was found that in some cases it was desirable to maintain a lower internal temperature during transport e.g. when transporting bare-rooted plants or heat sensitive food, therefore barrels are sometimes painted white to reduce insolation.

The barrels are excellent containers for transporting goods whether by jeep, helicopter or boat, as they are capable of holding a large volume of materials, all of which are kept dry. The barrels are highly durable to exposure to intense sunlight and transport of heavy goods, and their handles enable them to be carried easily. The plastic surface can be labelled with permanent markers and sticky labels. The drums are also washable.

Other uses for barrels: Although initially used for quarantine of transported materials, these barrels have been found to be very

versatile. For example, other valuable uses on Round Island include:

- seed trays for propagation of native plants in the nursery (Fig. 1)
- transport and storage of seeds
- refuse/composting bins and transport of non-biodegradable wastes back to the mainland for disposal
- food storage containers for dried food items
- water storage
- tubs for washing clothes
- storage of building material (e.g. sand, gravel, cement)



Figure 1. Old quarantine barrels recycled further (used as seedling trays) in the Round Island nursery.

Use of barrels on other islands and islets:

Due to their proven usefulness, the barrels are now used in restoration projects on other offshore islands, including more remote Mauritian islets (e.g. Agalega and St. Brandon). Personnel of the National Parks and Conservation Service have also adopted this simple, inexpensive and reliable quarantine tool. MWF has also encouraged the National Coast Guard (NCG) to adopt these barrels for their island trips. Whilst NCG showed a cautious response at first, they are growing increasingly aware of the advantages of the barrels for transportation of goods and other purposes.

Barrel donation: Blue barrels have been donated to MWF for the past 5 years by the textile industry owners who were keen to assist nature conservation and to find a 'green' alternative to disposal of the barrels.

Conclusions: The blue barrels are predominantly used for transporting goods to and from mainland Mauritius to Round Island and other offshore islets. All equipment and food is pre-quarantined, and put in the barrels with the lids sealed tight for transportation. Intrusion of any foreign organism (e.g. seeds, insects and other animals) is prevented once the barrel is sealed. The drums can also be secured further by applying packing tape around the rim of the screw top. MWF recognizes that quarantine procedures need to be constantly reviewed and the highest possible standard and vigilance maintained at all times.