Effect of Sand Cover on the Survival and Vigor of *Rosa rugosa* Thunb.

by
C. R. Belcher*

ABSTRACT — Rugosa rose, *Rosa rugosa* Thunb., is adapted to the northeast coast of the United States. It can be used to trap blowing sand or planted for beautification. Unpredictable weather conditions during the year of establishment have caused survival to be generally poor. Field observations have indicated that rugosa rose sprouted from old plants when covered with 30 to 60 cm of sand. To test this observation, rugosa rose was planted at three depths: 0, 15 and 30 cm deeper than the normal planting depth. Roses planted 30 cm deeper than normal developed expanded leaves sooner than did those planted at the normal depth. Peat moss mixed in the planting hole tended to delay leaf formation for the 0 cm treatment but had no effect on survival at any depth. Survival during the first year was 100% for the 30 cm depth and 93% for 0- and 15-cm treatments. The deeper planted roses were more vigorous at the end of the season than were those set at the normal depth. Rose hips developed on plants set at the two deeper treatments. No hips were produced on those plants for the normal depth. New roots grew on the buried stems. These new roots were near the sand surface rather than uniformly distributed along the buried stems.

INTRODUCTION

Methods on how to stabilize sand dunes along the mid-Atlantic coast using American beachgrass, *Ammophila breviligulata* Fern initially is well documented (Jagschitz and Bell, 1966; Thornton and Davis, 1964; Woodhouse and Hanes, 1966; Zak, 1965). Permanent stabilization may require the introduction of woody plants onto the dunes. Natural invasion of such plants is hemmed by variable and extreme climatic conditions. Some of these conditions are dry planting sites, salt spray, drying winds, and high temperatures. Successful transplanting of woody plants onto the dunes can speed up the transition of cover from pure grass to a mixed community of plants.

Success in establishing woody plants on sand dunes has been sporadic. This is primarily due to poor moisture retention by the sand, desiccating winds, and extreme temperatures at the sand-air interface (Graetz, 1973). One researcher reported a temperature in excess of 63°C near the sand surface on a summer day. Poor survival and low first-year vigor is a common occurrence (Sharp, 1969; Zak, 1967). Graetz tested nine woody species along the Carolina coast (Graetz and Nelson, unpublished data). Surviv-

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al in an unamended planting medium ranged from 17% for bayberry, *Myrica pensylvanica*, to 100% for false anvil indigo, *Indigofera pseudotinctoria* Marsum. He found that soil amendments had no effect on plant survival.

Rugosa rose, *Rosa rugosa*, tolerates sand deposition after it is well established, and stands have been reported growing vigorously along the Atlantic coast despite 45 cm of sand cover during one storm. In an attempt to improve survival and growth of rugosa rose, a shrub adapted to coastal conditions, a depth-of-planting study was made.

The objective of this study was to determine the effect of different planting depths of rugosa rose on its survival and first-year growth.

**METHODS AND MATERIALS**

A sandy site with a good American beachgrass cover was selected for the depth-of-planting study. The site is located immediately behind the primary dune on the high dunes in Avalon, New Jersey. Three planting depths were used: 1, 15, and 30 cm deeper than the plants grew in the nursery. Two soil amendments were used (1) one liter of peat moss mixed with beach sand in the planting hole, and (2) no peat moss. Five, 2-year-old rugosa rose plants were planted in each treatment. Each treatment was replicated three times. The planting was made on 10 April, 1974.

**RESULTS AND DISCUSSION**

Roses planted at normal depth were slow to leaf out. In fact with the peat moss treatment at the normal depth, they leafed out more slowly than when no peat moss was used. Thirty days after planting the percentage of plants (Table 1) that had leafed out was 53, 94, and 100 for the 1, 15, and 30 cm depths, respectively. There was no difference in the two deeper treatments for peat moss versus no peat moss.

<table>
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<th>Amendment</th>
<th>Depth*</th>
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* Depth refers to placement of the root collar below the sand surface.

The number of plants leafing out 30 days after planting was less for the zero treatment with the peat moss than for the other treatments: It is possible that lack of moisture near the surface restricted plant growth for the zero treatment. Moisture or the lack of it may have caused delayed leaf formation on the roses planted at normal depth. Rainfall for the 30 days following planting was 4.4 cm, while the normal for the period is 8.1 cm. The abnormally low rainfall after planting may have caused the top 15 cm of sand to dry out excessively, resulting in root desiccation for the zero treatment. Those roses planted at 15 and 30 cm depths could have been better supplied with moisture from deep within the dune profile. If this in fact happened, then one would expect quicker growth and more vigor from those plants set deeper than normal. The deeper set plants had less surface area exposed to the drying winds before leaf formation occurred. This could have been a factor in rate of leaf formation, but was probably minute.