Notes on Afforestation of Open-cast Mining Site at Rossmore Forest (Co. Carlow)

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AN area of 9.5 ha of an open-cast coal mining site at Slatt (near Crettyard, Castlecomer) was recently acquired. In view of probable increase in the development of such sites for forestry purposes an investigation into the difficulties and problems of afforestation thereon was deemed desirable.

A joint Management/Research project was initiated in June 1973, following which the area was planted in the spring of 1974. The following is the brief account of the undertaking.

Description of Site

The area forms part of the Castlecomer Plateau which is characterised by heavy gley soils derived from upper Carboniferous shales. Peat accumulation which is often associated with the type was not present. Elevation of the site is 700′. Exposure is moderate. Aspect N.E. to E but not pronounced.

When first inspected the area consisted of a shattered shaley rock distributed after mining in an irregular "hill & dale" pattern carrying virtually no vegetation. The former top-soil was accumulated towards one end (to the north) and also along the eastern edge. The site had been lying undisturbed for 2 or 3 years and only occasional patches of coltsfoot had become established.

It was decided to cultivate the area by ripper and modify the worst of the hill & dale effect by cut and fill with dozer blade. A D7 machine was used and was most effective in obtaining a deep rupturing of what had become a very compacted medium. The power available was invaluable in effecting modification of the hill and dale because of the amount of earth-moving involved.

Preliminary pH readings were taken and these showed a wide variation. Two from the general area gave values of 3.4 and 3.7. One from the top-soil area gave a value of 7.0 and another from a coltsfoot patch gave 7.8.

These results indicated the need for a more intensive survey of pH values. This was done on a 50m × 50m grid. Sampling points and pH values were mapped.

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On the basis of this survey it was possible to divide the area into two site-types. Site A consisted of topsoil of medium to high pH. Site B consisted of acid to very acid broken shale rock.

The former was treated with an application of superphosphate at 12.5 cwt. per ha (5 cwt per acre) (experimental work at Glanamoy indicated that higher levels of P as superhphosphate were not effective).

The latter site B was treated with 12.5 cwt per ha of rock phosphate. Both were applied broadcast, before planting by manure distributor mounted on wheeled tractor. Potassium fertiliser was not considered necessary at this stage.

Selection of Species

Site A was planted with *Abies grandis*. Experience at Clonsast had shown that this species can root in soil material of very high pH and there is no species of comparable productivity can do this.

Because of the nature of the soil in site B, mainly its complete lack of organic matter, it was thought that only two species, coastal lodgepole pine (*Pinus contorta*) and alder (*Alnus glutinosa*) would have any real chance of establishment. The major proportion of the area was planted with these two species.

Because of the possibility that the lodgepole pine would suffer from early damage from windsway in the stony soil, this was planted on the eastern portion where elevation was somewhat lower and shelter a little better, with the alder in the more exposed western part.

Other species which might be deemed as having some potential for success on these sites were Japanese larch and Sycamore. Trial plots of .2 ha ($\frac{1}{2}$ ac) each were tried with these species.

As a feature of interest it was also decided to try small plots of Sitka spruce and Douglas fir (approx. 0.1 ha) on a part of site B where the soil appears to contain more fine material than elsewhere.

Progress Report (*after one growing season*)

Following inspection at the start of the second growing season the following is a brief report on the results of the project to date.

The area is general still appears virtually vegetation free. Closer examination however reveals the presence of a number of grasses (mainly *Agrostis tenuis*) in the area treated with superphosphate. Patches of clover are frequent.

In the high pH area where *Abies grandis* was the major species, survival rate of the species had been satisfactory. Appearance and vigour however is not encouraging. The plants are very yellow and rather sickly looking especially in the more shaly areas.

Lodgepole pine on the high pH area had a somewhat lower survival

rate but the plants are healthy and while not yet showing the vigour associated with the species, promises to do well. Beating up of first season failures has taken place.

On the lower pH site alder had done well. Survival rate is high and the plants are vigorous and healthy. Lodgepole pine on this site has also done well. Survival rate is satisfactory and plants are again vigorous and healthy. Japanese larch has given equally promising results. Survival rate is good and the plants have a good appearance and look happy.

Both Douglas fir and Sitka spruce have not performed very well. Survival rates are low and plants look sickly and debilitated.

The other species of a particular interest on this site is sycamore. Survival rate is satisfactory. Flushing is not yet complete but plants are healthy looking, but as yet not displaying any significant degree of vigour after one growing season.

Progress Report (*end of second growing season*)

The following account was written following inspection in April 1975. This further paragraph was added following further inspection in October 1975.

The invasion of the site with grassy vegetation has proceeded steadily.

It will be recalled that the driest summer recorded for 30 years has ensued in the interim. The drought conditions which prevailed as a result would constitute a very severe test for growth in the conditions of friable rocky soil with sparse vegetation which obtained at Slatt.

In the event remarks relative to performance as recorded above are still valid with one perhaps notable exception. Great hopes had been placed in the potential of sycamore for such sites. The performance as recorded above reflects a mood of guarded optimism. Such optimism proved to be deceptive. The sycamore has virtually been wiped out during the current growing season. Whether this is due to the inherent soil conditions or due to the unusually dry conditions of the season is an issue which will only be resolved by further trials.

Further observations will be necessary in respect of all species before reliable conclusions can be reached.