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BREVIS, D.W.
MARTTIINI PLOW SCARIFIER

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FINAL REPORT

SX 81512 Q

MARTTIINI PLOW SCARIFIER

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SILVICULTURE TRIALS and TESTS

REPORT SX 81512 Q
INTERIM
FINAL X
DATE 82/02/12

TITLE Marttiini Plow Scarifier

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Introduction

Following discussion with a representative of Netherlands Overseas Mills Ltd., the Ministry of Forests made arrangements for the use of a Marttiini Plow with Mr. S. Ferdinand of the Alberta Forest Service. The Plow was made available after use in the Silvicultural Equipment Demonstration sponsored by the Northern Silviculture Committee.

Purpose

The purpose of the trial was to determine the applicability of this machine to the preparation of a site with a very high normal water table and a deep duff layer, for regeneration by hand planting. Survival and growth will subsequently be evaluated.

The Machine

The machine used was a Marttiini Plow KLM 240 supplied by the Alberta Forest Service (Photos #1 & 2). The plow has a single point swivel hitch to the prime mover. Further support is provided by the plow itself or the two ballon tired wheels. The depth of penetration of the plow can be varied by adjustments in the towing arm. In normal operation the wheels are retracted by means of a hydraulic cylinder controlled by the operator of the prime mover. The wheels are only used for turning or to lift the plow clear as necessary.

Photo #1 Plow in raised position.
The Site

The area treated was a virtually flat 60 hectares which had supported a P1-S stand. Logging took place in the winter of 79-80 under Cutting Permit 22 of T.S.H.L. A02958 located at Km 161 on the Willow River access road.

The soil is an impervious compacted lacustrine clay overlain with 2-3 cms of humus and 12 cms of moss. Shrubs on site are fireweed, twinberry, willow, horsetail and labrador tea. Some of the site had already deteriorated to a swamp condition.

The water table on the site is normally very high due to heavy rainfall and the impervious soil layer.
Photo #3  Untreated Site

Method

The plow was pulled by a D8 crawler tractor in parallel rows 3-4 metres apart at a level which would remove the L'and.F. layers, leaving an exposed humus layer at the shoulder levels (see Photo #4)

Treatment took place from August 28th to September 18th, 1981, a time during which weather conditions were ideal and the site was unusually dry.

Photo #4  Humus Shoulder
Results

The plow was successful in exposing a humus shoulder over the majority of the treated area (Photo #5). Productivity over the whole area was .65 hectares/hour using a D8 Cat at an hourly rate of $88.00. Costs were thus $135.38 per hectare.

The particular area had a higher level of debris than might normally be expected resulting in a considerable time loss in raising and reversing the plow in order to clear accumulated debris. The productivity indicated is therefore considered to be a minimum.

![Photo #5](image)

Conclusions

The Marttiini plow has provided planting sites on an area which would have been very difficult to plant satisfactorily without some fairly drastic method of site preparation. It is highly unlikely that a broadcast burn would have been useful since the moss was wet despite the extended dry period. Windrowing or piling with a brush rake might have worked but it would have to have been very drastic and would not be as uniform as the work done with the plow.

The proposal is to plant on the "shoulder" close to the side-cast material presuming that the shoulder will be above standing water and seedling roots will soon benefit from the accumulated adjacent nutrients. Since there is no slope to the ground, water will not drain away and will accumulate in the lower part of the trench. It is very doubtful that the depression can contain all accumulated water until evaporation commences. We would much rather have been able to produce mounds of suitable soil which would be higher than the normal soil level. Unfortunately we do not yet have an operational machine to produce the required mounds. While the Marttiini plow may not be as effective as we might wish, it appears
to have been the best available tool for this particular situation.

Follow-up

The treated site will be planted in the Spring of 1982. Customary examinations will be made for survival and growth. A limited comparison can be made between results on this treated area and the survival and growth on a similar adjacent site which had been windrowed and burned. The windrowing had resulted in a very minimal soil disturbance on this adjacent site. The area was planted in the Spring of 1981.