

Effects of Physiological Status of Tree-planters on Occupational Injury and Planting Productivity and Quality - Summary

Pilot study

A recent pilot study carried out in British Columbia showed that;

- Planters work at 40-60% of maximal oxygen consumption (60-75% maximal heart rate) for approximately six hours.
- Average fitness levels were only just a little higher than the values seen in people who do not exercise
- Total calories eaten as well as the timing and types of foods eaten were not optimal for providing energy during planting and for recovering from planting
- There was significant muscle wasting and suppressed ability to fight off infections or repair damaged tissues as the season progressed
- Blood sugar levels were low enough that reflexes and mental concentration would not be as sharp as usual

Main Study

Based on the pilot study, the objectives of this study were to determine if improving fitness levels or diet could enhance planting productivity and quality and/or reduce the number of injuries occurring during planting.

- Some planters trained for 8-weeks before the start of the season using high-intensity intervals, Thera-band, and body weight exercises. Workouts were done 6 days per week, but were generally only 20-30 min long.

Results of training:

1. More than 80% of training planters completed the program
2. Aerobic capacity was improved by about 15%
3. Trained planters planted faster for longer putting in approximately 250-300 trees/day more
4. They also experienced 40% fewer injuries or infections

Recommendation:

- Improving your fitness level prior to the planting season will help you plant more trees and stay healthy and injury free. Other measures specific to the demands of planting (wrist, arm, shoulder, back and leg endurance and/or flexibility) may also help reduce injuries and improve productivity
 - This program should be available to you for the 2004 season
- Some planters were given either Gatorade or a Placebo as a dietary supplement.

Dietary Results:

1. Drinking Gatorade or placebo helped keep fluid in the body. Gatorade also stopped blood sugar from dropping too low

2. Eating at bag ups also kept blood sugar levels from dropping
3. These changes prevented muscle wasting and helped stop the suppression of the ability to fight off infections and repair damaged tissues.
4. 30% of planters had iron levels low enough to impact energy production negatively
5. Levels of stress hormones were extremely high after 5 days off from planting. **As many injuries were sustained on days off as occurred during planting**, and those occurring on days off were more serious.

Recommendations:

- Using Gatorade or adding a small amount of sugar ($1/8$ - $1/4$ cup/L) and salt ($1/8$ tsp) to water and drinking at the rate of 500 ml/hr during planting will prevent dehydration
- Planters can check for dehydration by weighing in before and after planting, as long as clothing is identical
- Small snacks of low fat food should be eaten at least once an hour to stabilize blood sugar
- Eating a large carbohydrate based snack or meal within 1-2 hours of stopping planting will speed up recovery
- Total food intake should be higher in carbohydrates and lower in fats than the current planting diet. Target values are 60-70% carbohydrates, 15-20% proteins and 15-20% fats
- In addition to their normal food intake when not active, planters should consume approximately 6.8-7.8 kcal/min of *planting* activity (not including bag ups or travel time) to balance energy used and calories consumed. Another way to figure this out is to multiply weight in kg (including bag weight) x hours of activity x between 5 (for females on level ground) to 7 (for males on steep ground)
- Fats require approximately 3 hours to digest, proteins require 2 hours and carbohydrates require anywhere from 5 min to 1 hour depending upon the type and amount of fibre. Food intake in the morning should allow time for food to be digested prior to planting
- Storage iron in the form of ferritin should be checked by the regular medical system at least 8 weeks prior to planting. Supplements should ONLY be used if necessary (ferritin levels are less than 30 $\mu\text{g/L}$) as iron can be poisonous in excess. They also cause constipation or diarrhoea, and bad gas – so DON'T take iron unless you have to!
- Planters should consider the effect of sleep loss and excessive use of recreational substance on their ability to plant, and thus make money. Maybe there are other ways of blowing off steam?

For more information contact:

Dr. Delia Roberts
Selkirk College
Castlegar, BC V1N 2Z1

(250) 365-7292
droboters@selkirk.bc.ca