Power Eating for Power Planting

POWER EATING

A manual for planters, cooks and foremen full of strategies for increasing productivity, enhancing recovery and reducing injuries.

In other words - how to plant hard all season - without getting hurt.

These materials have been made possible by collaboration between Weyerhaeuser Company Limited and The Forest Industry Safety Association of British Columbia.

Produced by Multimedia Production and Design, Selkirk College.

Weyerhaeuser

FISA
FORESTSAFE.CA

WHAT AND WHEN TO EAT TO PLANT PRODUCTIVELY

Eating right doesn't win races, but eating wrong can lose them. Tree planters are not running a race, but they are putting their bodies through the same sort of challenge - day after day. Planters want to make money and survive the season without getting hurt. And eating right can help them do just that.

The correct diet can't replace good pre-season fitness preparation (for a program see *http://online.selkirk.bc.ca/treeplanting,* but it certainly can influence how a planter responds to the work that has to be done.

It can make a huge difference in how someone feels at any given point in time, so they can work hard.

It can make sure they have the energy to plant fast when they want to.

It can speed up recovery so they can work hard again tomorrow.

It can provide the nutrients needed to build and repair tissue in response to the work.

It can help the immune system protect against infections.

Planters make their food choices based on taste preferences, easy access, and how appealing the food looks and smells. Cost, ease of preparation, and need for refrigeration are also important issues. No one can be forced to eat only healthy food, but cooks do have a huge influence because planters will select their choices from what has been prepared.

So what should planters eat? The answer to this question is that it depends on how much time there is to digest and absorb the food before beginning to plant, and how much work the planters have to do over the whole day.

BREAKFAST

Breakfast is a critical meal for planting. It's a chance to make sure that carbohydrate (CHO) stores and body water are topped up and to provide something to fuel the first couple of hours of planting. The best choice of what to eat depends on *how long a delay there will be before starting planting.*

Delay Of 3 Hours Or More Between Breakfast And Planting

If there is a long delay before beginning planting, the fat content of breakfast can be high. There will be plenty of time for digestion and the energy provided by this breakfast will be needed for what is sure to be a long day. For a delay of **3 hours** or more between breakfast and planting **include some high-fat foods**, such as:

Cheese
Bacon or sausage
Fried foods, such as hash browns

Delay Of 2- 2½ Hours Between Breakfast And Planting

If the delay between completing breakfast and starting to plant is **2-21/2 hours** in total, there is time to digest protein but not much fat. Good choices are:

Eggs: use a light hand when greasing the griddle; poach or boil.

Lower-fat breakfast meats: if available.

Low-fat yogurt, cottage cheese, tofu: puree cottage cheese or tofu and add to hot cereal, muffins, pancake mix, etc. or melt with a touch of cheddar in a cheese sauce for eggs.

Beans: including ethnic foods like bean/rice/corn combinations or bean burritos (If your campmates have sensitive noses, try one of the new digestion aides like "Beano" to help reduce intestinal gas).

French toast: cook with minimal fat and serve with yogurt and fruit instead of butter and syrup. The trouble with syrup is that as a simple sugar it will stimulate release of the hormone insulin. Insulin makes a all that lovely food move into storage, rather than let it be used for planting. See Appendix VIII for more informationon on insulin, and how this hormone affects health and performance.

Delay Of 1 - 1½ Hours Between Breakfast And Planting

If the time from breakfast to planting is **1- 1½ hours** then you want to stick with mostly CHO, but you need to slow digestion down a bit, so either add a **little low-fat protein or fiber from whole grains**. Choose foods such as:

Whole grain breads, bagels, or English muffins with a minimum butter, margarine, or jam: For toppings try a yogurt, cottage cheese and fruit puree, tofu and fruit puree, or spicy bean spread instead.

Small amounts of egg, lower-fat meats, or cheeses.

Oatmeal or whole-grain cereal with milk .

Pancakes with yogurt and fruit, (it's good - really! Try it).

Muffins prepared without too much oil or sugar (see Appendix I). Go easy on standard muffins and toast with butter/margarine and jam. For one thing, the sugar will stimulate the release of insulin and a move breakfast into storage rather than keeping it available to fuel planting. It's also important to keep the fat content low because in 1½ hours there isn't time to digest fat. Instead fill up with foods that will be available as fuels when needed.

Delay Of Less than ½ Hour Between Breakfast And Planting

If the time from breakfast to planting is less than **½ hour** you have a different challenge. The food needs to be digested as quickly as possible, but won't have much lasting power. For less than 15 minutes, don't worry about insulin - the planters will be working before it can be released.

On these days planters will have to rely on snacks and lunch food much more than on days when they can eat a large breakfast. Plan on having extra muffins or squares available. Good breakfast choices on days when there is very little time between breakfast and planting are:

Toast with jam.

Pancakes with syrup (but still easy on the butter/margarine).

Processed cereals with sugar and low-fat milk. Low-fat milk is a good choicebecause as a protein source it has some staying power, but as a liquid it leaves the stomach quickly.

A liquid meal replacement. If a blender is available, an excellent choice would be yogurt and fruit pureed with tofu, extra skim milk powder, wheat germ, and even a salmonella-free egg (If the egg is uncooked there is a greater risk of infection, so if you include a raw egg be absolutely sure it is bacteria free).

Time Frame Falls Between The Guidelines Given Above

If the time frame falls between the guidelines given above, combine suggestions from the closest categories. For example between 1½ and 2 hours, eat whole grains together with some protein. For 2½ - 3 hours add a little fat to your protein meal.

LUNCH/SNACKS

Just as for the ½ hour-or-less breakfast, food eaten in the block needs to be digested and absorbed very quickly. Likewise, because work will begin right away you don't have to worry about insulin. Liquid foods and simple sugars are good sources of quick energy. But this also means that they do not last very long. So if you don't want to plant with food sitting in your stomach, waiting to be digested, it is very important to **eat small amounts at every bag up.**

For Bag-Ups That Run Every 45 Min - 1 Hour Choose From These Quickly Digested Foods:

Fresh fruit (cut in chunks that are just a bite or two). Easy to eat and full of juice, vitamins, and sugar all shapes and colors - fruit can't be beat.

Sports drinks like Gatorade or sweetened dilute juice with abit of salt will give fuel and water (see the section on hydration for a homemade sports drink recipe). Plan on drinking 500ml every hour - more when it's really hot, at altitude, or if you tend to sweat heavily.

Sweet or savory baked goods like tea breads, muffins, squares, and cookies are excellent if prepared with at least half of the oil/margarine/butter substituted (see Appendix I and II). By adjusting recipes this way, you reduce the fat content, speeding up digestion and increasing the concentration of nutrients.

Cold baked potatoes (especially flavorful red potatoes - just wrap in foil to bake; they are cheap, fast, and nutritionally sound).

Vegetable pieces, especially carrots, peas, turnips, corn, beets, and parsnips.

White rice (digested very quickly - and remarkably satisfying when working hard).

Trail mix made with nuts, raisins, pretzels, and cereals such as Cheerios and Shreddies.

Pock et treats such as **hard candies, jujubes, gummy bears**, and licorice for energy between bag-ups.

For Longer Runs (1- 2 Hours Apart):

Planters need to add a bit of fiber and protein to their snacks when the time between bag-ups is longer. The only way to provide adequate fuel for the whole day is to take the following ***at every bag-up***:

A **long drink** as suggested above, with a bit of salt and sugar, at a rate of about 500 ml/hr (more if it's very hot, at altitude or you tend to sweat heavily)

Half sandwich (or more), made with a little lean meat, cheese, bean spread, or peanut butter and jam (go light on cheese or peanut butter due to their fat content).

A **cup of fruit** (as much as in 1-2 whole apples, pears, or bananas).

A **sweet treat**, half a muffin/square/or slice of tea bread.

A steady supply of CHO and energy during the day is essential.

Besides being needed for planting, this fuel keeps the nerve/muscle reflexes working to protect against injury. It also keeps the immune system working to repair all the small bits of wear and tear in muscles, tendons and ligaments as well as fight off the infections that tend to get passed around with camp life. Eating right can really help **reduce planting injuries and illness**.

AFTER PLANTING

Immediately after stopping planting the body is primed for restoration and repair. The enzymes that store glucose in muscle and liver work best only for a couple of hours after exercise stops. That's why it's especially important to make use of this short period where **recovery is accelerated** by supplying the necessary materials for recovery: CHO and just a little protein. The rate of recovery drops off in the **first hour,** and again in the second hour **following the end of exercise.**

So once again, what the planters need to eat depends on the time delay between working and eating (dinner this time).

Dinner Served Within 1- 1 ½ Hours From When Work Stops

If supper is served within an hour *of the end of planting* then planters can wait for dinner, and pretty much eat what they like. But if there is a delay of more than one-hour total time between when planting finishes and when dinner is served plan to provide a snack in this time frame.

Dinner Served More Than One-Hour From When Work Stops

If the delay is due travel time, planters should pack an extra lunch to eat on the way home. Include the following:

An **extra sandwich**

Several pieces of **fruit**

One or two **muffins/squares/slices of tea bread** or **potatoes** or **rice**

Fluid to make up any shortage during the day

If planters have **returned to camp** and the delay is for clean up, then good choices are:

Soup

Bread, pasta or **rice**

Either way it is critical for recovery that planters eat some CHO (about 300-600 kcal depending on body weight) within 1-2 hour of stopping planting. The longer the delay, the harder it will be for planters to replace the CHO (called glycogen) stored in their muscles. This is probably the single most effective strategy for enhanced recovery!

DINNER

If planters have eaten properly during the day they won't need to stuff themselves at dinner. The idea is to provide the fuel when needed and help keep from swinging between starvation and gorging. If an after-planting snack is eaten within the 1-hour time frame (absolute maximum 2 hours) then there aren't really any constraints on what to eat for dinner.

Go ahead and serve/eat what feeds the senses. BUT if this opportunity for restoration was missed, it's very important to make sure that enough CHO is provided to replenish what was used during the day.

The longer it has been since planting stopped the harder it is to do this (because the enzymes are much less active). The only way to get the CHO into the muscle after 2 hours is to eat large quantities of CHO with very little protein and fat. It's much healthier and more effective to avoid this situation with an after-planting snack.

No Food Eaten For More Than Two - Hours From When Work Stops

For **delays of 2 hours or longer,** go light on fats. Skip any extra butter or oil; go easy on gravy, cream sauce, cheese, and salad dressing, and bake rather than fry. Serve several types of breads and rolls so that planters sample more than one type. Along with a small serving of meat, fish, chicken, or beans and a variety of vegetables, be sure to include plenty of:

Rice and other grains

Pasta

Potatoes, sweet potatoes, carrots, parsnips, rutabaga, and **peas**

Bread and **rolls**

WATER and HYDRATION

There has been a lot of publicity on hydration in the last few years. In truth, getting hydration right is a real performance enhancer. Fatigue and health risks follow drinking too little, but this is also true of drinking too much. The recommended rate of intake during exercise is **500ml/hr, in small amounts taken frequently**. So if planters are going to be out in the block for 8 hours they will need to take at least 4 liters of fluid, more on hot dry days, less when it's cooler and they won't be sweating as much. At higher elevations they'll lose more water, so the allowance should be a bit more generous when planting above about 6000ft or 1800m. People who sweat heavily also need more fluid every day.

It really helps to add a small amount of sugar and salt to water to speed up absorption and retain the fluid. Doing this can postpone fatigue and increase the ability to work faster. Use a commercially prepared sports drink or make your own.

To make a 6% CHO solution, add to each liter of water:

60 gm or ¼ cup sugar
0.5 ml (1/8 tsp) salt
pinch of potassium chloride

Or begin with sweetened orange juice:

Dilute reconstituted juice by half with water
Add 1/8 tsp Salt per liter

The easiest way to ensure frequent access to fluid during planting is with a backpack hydration system. If you position the tubing carefully, it's by far the fastest way to get a drink. It does require a bit of maintenance though.

Rinse the tubing and reservoir out regularly to prevent them from getting moldy and every now and then immerse them for in boiling water for 10 min. If the harness is uncomfortable, or flips up and hits you in the head when you bend over, try keeping the reservoir in your back-bag.

Planters can check that they are drinking enough during the day by weighing themselves in the morning and again when planting is done. Ask your contractor to provide a good set of scales on a large piece of plywood to keep it level. It's important to wear the same clothing both times, make sure that pocket contents are the same, and that boots aren't covered in mud. This way any change in weight should reflect water loss through perspiration and breathing during the day.

A one-pound weight loss equals two cups of water; a one-kilogram loss equals one liter of water.

CONCLUSION

These are the basics about what to eat, when - but there is more to come so don't stop reading just yet. Understanding the "why" and "how" will help you make decisions about whether your recipe and choices are good for a particular camp, on a particular day. You can use this information when planning your meals, purchasing supplies, and even keeping yourself healthy in the face of heat, long days, and way too little sleep.

The reality is that camp cooks and planters often don't know ahead of time how long a planting day will be or how much time/travel will be involved. But now that you understand the importance of supplying the right fuel at the right time, you can ask your foremen/crew bosses to give you the information you need, whenever they can.

The guidelines in this package can help you make small adjustments to your own menus and recipes, or what you pack to take into the block, to **make your planting contract the most productive ever.**

TOP TEN TIPS

To print a pocket sized document that includes the key points made here visit:

http://online.selkirk.bc.ca/treeplanting

FEEDBACK

Any comments, suggestions or questions?

E-mail Delia at *droberts@selkirk.ca*

Or visit: *http://online.selkirk.bc.ca/treeplanting* and follow the links.

APPENDIX I - PREPARING MEALS WITHOUT ADDED FAT

The fat content of a meal can often be greatly reduced without adversely affecting the taste or texture. Some items such as brownies and cookies will require slightly more fat, but you can still cut the oil, margarine or butter in them considerably.

When preparing baked goods, the oil or margarine can usually be reduced to about ¼ - ½ of the amount called for by the recipe. Simply increase the liquid ingredients by the amount you've reduced the fat content. Replace the deleted fat with pureed fruit of any kind, egg whites, or yogurt with good results. You can also add cottage cheese, tofu, or dry skim milk powder to boost the protein content and wheat germ/seeds/grains for extra nutrients. Rather than greasing the pan, sprinkle it with cornmeal, oats, flour, or groundnuts to prevent sticking. Reduced-fat baked goods do go stale faster than the high-fat versions but baked goods don't usually last long enough for that to be a problem in planting camp!

Minimize fat in **stews and other dishes that require pre-browning or sautéing** by using a non-stick pan. In many cases no oil is required at all; in other cases adding a little water or broth may be necessary to prevent sticking. Cool stews and soups after simmering so the extra fat congeals and can be spooned off. Broiling or barbequing are great ways to cook as they allow fat intrinsic to the meat to melt off (but may not be practical techniques for planting camp.). See Appendix II for a description of how to braise meat without any added fat.

In recipes where **ground meat or chunks of beef** are called for, the amount of meat can be reduced and combined with beans for higher-fiber, lower-fat dishes. Fish, poached, baked, broiled, or barbequed without adding oil or butter should be served at least once a week (if your budget can manage it). Use water-pack over oil-pack versions for tuna and other canned foods. Vegetarian dishes with beans or tofu are often lower in fat, but be careful: Many vegetarian recipes and prepared dishes contain a lot of oil or high-fat ingredients like cheese.

Peparing **cream and cheese sauces** is more difficult. Low-fat cheese does not melt as nicely as full fat cheese does, and in most cases it's still relatively high in saturated fat. If cheese must be added as in pizza or to top lasagna, use only a sprinkling. **Full-flavor toppings** such as water-pack artichoke hearts and a sprinkle of feta go a long way to replacing lots of gooey mozzarella. Condensed skim milk and low-fat yogurt can sometimes replace cream. White sauce can be made without butter, but requires additional seasoning for flavor (try mustard, Worcestershire sauce, and/or dill).

Delicious **oven fries and roast potatoes** can be made by rinsing cut up potatoes in cold water to remove excess starch, then tossing in a bowl with a teaspoon of olive oil for every 3 potatoes. Add spices to this mixture for a little extra punch. Place the potatoes on cookie sheets without crowding too much and bake at 375˚C for 45 min till crispy and golden - wonderful!

There are some good **low-fat dressings and skim-milk yogurts and cheeses** on the market. **Ices and sherbets** replace high-fat ice creams. With a little care a great deal of fat (especially unhealthy saturated and trans fats) can be cut from the diet. See the next appendix for some recipes!

VEGAN STEW

Moroccan Stew

2	Large sweet potatoes or yams, peeled and cut into 1-inch cubes (6-8 cups or 1.5-2 liters)	2
1	Large onion, diced (2-3 cups or 500-750 ml)	1
4	Garlic cloves, minced	4
4-6 cups	Assorted chopped vegetables (celery, green pepper, zucchini)	1-1.5 liters
4-6 cups	Assorted cooked beans	1-1.5 liters
2-3	Cans stewed tomatoes (19 oz each)	2-3
¼ cup	Lemon juice	60 ml
1-2 tbsp	Each ground coriander, ground cumin, chili powder, curry powder	15-30 ml
1 tsp	Black pepper, ground	5 ml
½-1 cup	Raisins	125-250 ml
1 cup	Peanut butter	250 ml
6 cups	Vegetable broth (to cover vegetables)	1.5 liters
	Fresh chopped cilantro	
	Salt to taste	

Simmer all ingredients together and serve over Couscous.

This is my current favorite!

PASTA SAUCE

Spicy Sesame Pasta Sauce

¼ cup	Sesame seeds, toasted	60 ml
1 tbsp	Garlic, minced	15 ml
4 tbsp	Fresh ginger, minced	60 ml
3	Scallions, minced	3
¼ cup	Peanut butter	60 ml
3-4 tbsp	Warm water	45-60 ml
¼ cup	Soy sauce	60 ml
¼ cup	Rice or wine vinegar	60 ml
1 tsp	Hot sauce	5 ml
1 tbsp	Sugar	15 ml

Whirl it all together in a blender and serve over hot pasta, veggies and tofu or bite-sized (cooked) chicken or beef strips.

Yum (I never really measure, but I go heavy on the ginger....)

LIME CURRY STIR FRY

Lime Curry Stir Fry

MARINADE:

¼ cup	Soy sauce	60 ml
2 tbsp	Brown sugar	30 ml
2 tbsp	Fresh lime juice	30 ml
2	Cloves garlic, crushed	2
1 tbsp	Fresh ginger, grated	15 ml
¼ tsp	Hot chilies/ sauce	1 ml

Marinate 500g shrimp, chicken, tofu or beef

125 g rice vermicelli (soak in hot water 15 min), chow mien noodles (steam 3 min) or rice (cooked)

1	Onion , chopped	1
1	Sweet red pepper, chopped	1
1	Carrot, chopped	1
	Other stir fry vegetables as desired	
2 tsp	Curry powder	10 ml
1 tsp	Ground coriander	5 ml
1 tsp	Ground cumin	5 ml

Drain meat, reserving marinade. Stir fry 2 min in 2 tsp canola oil. Set aside Stir fry vegetables 1 min, add spices and noodles, cook 2 min. Add meat and marinade and cook 2 min longer.

MARINADE

Mustard Pepper Marinade

2 tbsp	Dijon mustard	30 ml
1 tbsp	Lemon juice	15 ml
1 tbsp	Crushed peppercorns	15 ml
½ tsp	Dried oregano	2 ml
3 lbs	Beef roast	1.5 kg

Combine all ingredients and rub over meat. Marinate overnight. Cook roast 20 min/lb, let stand 10 min. then slice thinly. Use left over marinade to make a sauce by adding 2 cups of beef broth (500 ml) and then simmering 15 min. Thicken with flour and water.

Braising Beef

Use this method to begin any stew, curry, or dish that requires tender chunks of beef. Prepare the meat early in the day or even a full day before you need it.

¼ pound	Meat/person, cut into cubes and trimmed of fat	0.10 kg
½	Medium onion/person, thinly sliced	½
½	Clove garlic/person, minced	½

Put all ingredients in a large pot with a tight fitting lid, cover with water and bring just to a simmer. It's important not to boil the meat at any time or it will toughen.

Cover the pot and simmer for at least 30 min, stirring occasionally. Then uncover the pan and continue to simmer and stir occasionally until nearly all the fluid has evaporated (about 30-45 min). When the level starts to get low you have to stir it frequently to keep the meat from sticking and burning, the last 15 min it will need constant stirring. Once the fluid is gone the meat will brown up nicely. Cover again with about ½ cup of broth/person, stir to free up all the browned bits. You can pause now, or bring to a simmer again and cook until the meat is very tender (45 min - 2 hours). You may need to add more broth.

Hungarian Goulash

2 lbs	Beef chuck or round cut into cubes	1 kg
¾ cup	Ketchup	180 ml
2 tbsp	Worcestershire sauce	30 ml
1 tbsp	Brown sugar	15 ml
2 tsp	Salt	10 ml
2 tsp	Paprika	10 ml
½ tsp	Dry mustard	2 ml
	Cayenne pepper to taste	
1 ½ cups	Water	375 ml
2 tbsp	Flour	30 ml
¼ cup	Water	60 ml
6 cups	Hot cooked noodles	1.5 liters

Begin with braised beef, add spices and 1½ cups water. Cover and simmer 2 hours in total (if you simmered the braised beef after browning you can cut this time down to ½ hour). Thicken with water and flour and serve over hot noodles (Cook noodles just to al dente and do not add any extra oil).

Berber Marinade for Beef

1	Medium onion, diced	1
3	Cloves garlic, minced	3
2 tbsp	Fresh ginger, minced	30 ml
½ cup	Paprika	125 ml
1 tbsp	Coriander seed	15 ml
2 tsp	Cracked black peppercorns	10 ml
2 tsp	Cardamom pods	10 ml
1 tsp	Hot pepper flakes	5 ml
1 tsp	Cinnamon	5 ml
½ tsp	Whole allspice	2 ml
¼ tsp	Ground cloves	1 ml
1 tbsp	Salt	15 ml
¼ cup	Lemon juice	60 ml
1 tbsp	Olive oil	15 ml
2 tbsp	Broth	30 ml

Cook spices together with onion, garlic and ginger in a dry skillet over medium heat for 2-3 minutes. Combine all ingredients in a blender and puree to a smooth paste. Spread over beef, poultry or seafood and marinate overnight. Grill beef and slice thinly, serve with rice. Use the left over marinade to make a sauce by adding 2 cups (500 ml) of beef broth and then simmering 15 min. Thicken with flour and water.

Mexican Beef and Beans

1 lb	Lean ground beef	0.5 kg
1	Large onion, chopped	1
6	Cloves garlic, minced	6
1 ½ cups	Cooked black beans (see cooking instructions below)	375 ml
2	Medium green peppers, cut in chunks	2
1	Large can diced tomatoes (28 oz or 796 ml)	1
1 cup	Frozen corn	250 ml
2 tsp	Cumin, ground	10 ml
2 tsp	Hot red pepper flakes	10 ml
½ tsp	Black pepper	2 ml
2 tbsp	Red wine vinegar	30 ml
	Salt to taste	
	Handful of fresh cilantro, chopped	
	Top with black olives, pitted and chopped	

Cook beef until browned over medium heat and drain off fat. Add onion, garlic, and pepper chunks and cook for 5 minutes or until shiny and softened. Add cooked beans and tomatoes and cook for 10 minutes more. Add remaining ingredients and simmer for 15 minutes or until sauce is desired thickness (add cilantro during final 5 minutes). Serve over rice or cornbread or wrap in tortillas.

Spicy Beans

Go thorough the dried bean section at the store and select at least 6 different varieties. Mix ½ cup of each variety in a large pot. Rinse several times with cold water, and then let stand overnight covered in cold water. Change the water and bring to a boil, then let simmer several hours until the beans are soft. Drain well. I throw some beans made from this mix into most any recipe for an added source of low fat protein.

4-6 cups	Drained cooked beans	1-1.5 liters
3-4	Juice from 3-4 fresh limes	3-4
3 tbsp	Each of chili powder, coriander, cumin	45 ml
1 tbsp	Salt	15 ml
4	Garlic, crushed	4
1	Onion chopped	1

Mix all ingredients and bring to a simmer, you may need to add about ½ cup of water to form a bit of sauce. Simmer ½ - 1 hour, serve with tortillas, lettuce, other vegetables, and salsa.

Makes a great dip/sandwich spread as well.

Hummus (Chick-Pea Spread)

¼ - ½ cup	Tahini (sesame paste, or peanut butter drain off the excess oil)	60-125 ml
½ tsp	Salt	2 ml
1 tsp	Cumin	5 ml
2	Large cloves garlic, crushed	2
1	Medium onion	1
2 tbsp	Lemon juice	30 ml
3 tbsp	Hot water	45 ml
1	Can cooked chickpeas, drained (500 ml)	1
	Chopped fresh parsley	
	Cayenne pepper to taste	

Blend all ingredients in a food processor until smooth. Serve with vegetables, pita bread or in a sandwich.

Baba Ghanouj

Follow the recipe for Hummus but use roasted eggplant instead of chickpeas. Char the whole eggplant on a barbeque for a really wonderful smoky flavor, then scrape out the pulp and add to the other ingredients.

Quick and Easy Stir Fry

1 lb	Lean beef, chicken breast, or firm tofu, cut in thin slices	0.5 kg
4	Garlic cloves, chopped	4
3 tbsp	Fresh ginger, chopped	45 ml
1 tsp	Hot red pepper flakes	5 ml
1 tbsp	Canola oil	15 ml
1	Medium onion, chopped	1
2	Green and/or red peppers, cut in strips	2
1 cup	Mushroom, sliced	250 ml
2 cups	Broccoli flowerets, green beans, or asparagus	500 ml
½ cup	Cold water	125 ml
1/3 cup	Black bean sauce	80 ml

In a large wok, heat garlic, ginger, and pepper flakes in oil. Toss beef, chicken, or tofu slices until cooked and set aside. Add a little more oil if needed to coat pan. Toss veggies until each piece is shiny. Add water, cover, and steam 5 minutes. Add cooked beef, chicken, or tofu pieces and black bean sauce and heat through (about 2 minutes). Serve over rice or noodles with a sprinkling of chopped cashews or toasted sesame seeds.

Honey Orange-Spice Sauce

1 lb	Lean beef, chicken breast, or firm tofu, cut in chunks	0.5 kg
4	Garlic cloves, chopped	4
2 inches	Fresh ginger, sliced thinly	4.5 cm
1	Medium onion, chopped	1
1 tin	Frozen Orange Juice Concentrate, thawed + 2 tins water	1
4 tbsp	Honey	60 ml
¼ cup	Soya sauce	60 ml
¼ cup	Vinegar	60 ml
2 tbsp	Lemon Juice	10 ml
1 tsp	Curry powder	5 ml

Mix all ingredients except the meat/tofu together and simmer for 15 min. If desired stir-fry the meat first, or just add directly to sauce. You can also use pre-cooked or left-over meat or chicken. Simmer meat in sauce another 20-30 min until the meat is done, or heated through for tofu or pre-cooked meat (about 10 minutes). Serve over rice or noodles.

Note for Motel or Home Based Planters

All of these recipes can be made ahead in large quantities and reheated. Let's face it - by the end of the planting day there isn't much energy left over to start preparing a meal. You need something that is fast and easy to prepare. Other good choices are any stir-fry with lots of rice, noodles or wrapped up in a tortilla.

MUESLI

Muesli (per person)

¾ cup	Rolled oats (mix rolled with instant)	180 ml
1 tbsp	Raisins	15 ml
1/8 tsp	Salt	0.5 ml
1 tsp	Sugar	5 ml
¼ cup	Yogurt	60 ml
¾ cup	Milk	180 ml
¼ - ½ cup	Fruit + juice	60-125 ml

Mix all together (should be very thin consistency) refrigerate overnight, it gets even better after sitting for a few days

PANCAKES

The Best Pancake Recipe Ever

3	Eggs, beaten	3
3 cups	Flour (I use a mix of 1 cup white, 1 cup whole wheat and 1 cup of: cornmeal, oats, whatever)	750 ml
¼ cup	Wheat germ	60 ml
¼ cup	Bran	60 ml
½ cup	Skim milk powder	125 ml
2 tbsp	Baking powder	30 ml
1 tbsp	Baking soda	15 ml
2-3 cups	Water to make a THIN batter Optional: 1 tsp each salt and sugar (I leave these out)	500-750 ml

Stir to mix well and then add 1-1½ cups (250-375 ml) plain yogurt - it will bubble and foam and makes lovely light pancakes. Serve with fruit and yogurt as a topping

Most recipes for baked bars, sweet breads, or muffins can be adjusted by decreasing the oil content by at least half and substituting either yogurt or pureed fruit (such as applesauce). I also often decrease the sugar by about 1/3. You can substitute about 1/4 the volume of flour with dry powdered skim milk and other goodies such as wheat germ, or ground nuts, or extra eggs, or pureed tofu or cottage cheese to raise the protein content.

POWER BARS

Home Made Power Bars

¼ cup	Canola oil	60 ml
2	Eggs	2
½ cup	Honey	125 ml
½ tsp	Salt	2 ml
½ cup	Orange juice concentrate	125 ml
½ cup	Whole wheat flour	125 ml

Mix all the above ingredients together and then start adding the goodies, about a cup of diced dried fruit (dates, raisins, figs, apricots), a cup of finely chopped or ground nuts and seeds, and about a cup of a mix of low-fat dry skim milk powder, oats, wheat germ, and/or coconut. Oh yes, chocolate chips are nice! If the dough gets too stiff add another egg or a bit more orange juice concentrate and honey.

(For a more economical version, use raisins and chopped apples for the fruit, more oats and/or some dried breadcrumbs and fewer nuts.)

Spread evenly in a greased 9-inch pan and bake at 300° F for about 40 min, Do not over brown.

BERRY MUFFINS

Blueberry Bran Muffins

2 ½ cups	Bran	625 ml
2 cups	Whole wheat flour	500 ml
½ cup	Granulated sugar	125 ml
1 tbsp	Baking powder	15 ml
1 tsp	Baking soda	5 ml
2	Eggs, beaten	2
2 cups	Buttermilk (or soured milk)	500 ml
¼ cup	Skim milk powder	60 ml
¼ cup	Wheat germ	60 ml
1/3 cup	Vegetable oil	80 ml
1/3 cup	Molasses	80 ml
1 cup	Blueberries	250 ml

Mix dry ingredients together in a large bowl, make a well in the center. Crack the eggs into the well and pour all the liquid ingredients over the eggs. Mix the eggs into the liquid first and then the dry into the wet stirring just until moistened. Spoon into baking cups. Bake at 375° F for about 25 min or until firm.

CARROT CAKE

Carrot Cake

1 ½ cup	Shredded carrots	375 ml
½ cup	Raisins	125 ml
½ cup	Plain non-fat yogurt	125 ml
¼ cup	Skim milk powder	60 ml
½ cup	Unsweetened applesauce	125 ml
¼ cup	Canola oil	60 ml
1	Large egg or 2 whites	1
1 ½ cup	Sugar	375 ml
2 tsp	Ground cinnamon	10 ml
½ tsp	Each ground cloves and nutmeg	2 ml
½ tsp	Salt	2 ml
1 cup	Whole -wheat flour	250 ml
1 cup	All-purpose flour	250 ml
¼ cup	Wheat germ	60 ml
1/3 cup	Warm water with	80 ml
	1 ½ tsp (7ml) baking soda mixed in	l

Stir the carrots, raisins and spices together with all the wet ingredients except for the baking soda and warm water. Then stir in the sugar, flours and the soda and water. Pour into a 9-inch square non-stick pan and bake at 325°F for 1 hour or until a pick inserted into the center comes out clean.

Ice when cool with the following:

ICING

Cream Cheese Icing

2 cups	Icing sugar	500 ml
½ cup	Plain non-fat yogurt	125 ml
½ lb low-	fat cream cheese	125 gm
	Lemon or orange juice	

Beat the cheese well, gradually beat in 2 tsp juice, the yogurt and then the sugar. Thin to desired consistency with juice or yogurt.

This recipe also works well for chocolate frosting, leave out the cream cheese, using about 1/8 to ¼ cup of margarine and add about ¼ cup of dry cocoa powder.

RAISIN COOKIES

Oatmeal Raisin Cookies

½ cup	Margarine	125 ml
¾ cup	Brown sugar	180 ml
2	Eggs or 4 egg whites	2
½ cup	Applesauce, pureed orange or mashed banana	125 ml
1 cup	Flour	250 ml
1 tsp	Baking soda	5 ml
2 ½ cups	Rolled oats	675 ml
2-4 tbsp	Combine wheat germ, oat bran, 7-grain cereal, chopped seeds or nuts as desired	30-60 ml
½ tsp	Almond extract or 1 tsp (5 ml) Amaretto	2 ml
1 tbsp	Up to 1 tbsp milk, water, or yogurt	15 ml
½ cup	Raisins	125 ml

Beat margarine with brown sugar until sugar dissolves. Beat in eggs, then fruit, baking soda, and Amaretto. Stir in flour, oats and other grains/nuts, and finally raisins. Dough should be stiff.

Drop by spoonful onto pan and bake at 350°F for 8 min. Cool on pan and drizzle with glaze.

Glaze

1 cup	Icing sugar	250 ml
1 tsp	Amaretto (or ½ tsp almond extract)	5 ml
2-3 tbsp	Water	30-45 ml

CHOCOLATE CHIPS

Chocolate Chip Oatmeal Cookies

1 cup	Margarine	500 ml
1 cup	Each white and brown sugar	500 ml
4	Eggs or 6 egg whites	4
1-1 ½ cups	Cottage cheese	250-375 ml
½ cup	Each skim milk powder, wheat germ, bran	125 ml
1 ½ tsp	Baking soda	7 ml
1 tsp	Salt	5 ml
1 tsp	Vanilla	5 ml
2 cups	Flour	500 ml
3 ½ cups	Rolled oats, or more to make a stiff dough	875 ml
1 cup	Chocolate chips	500 ml
	Chopped nuts, seeds or raisins as desired	

Use a blender to puree the cottage cheese. Beat margarine with sugars until dissolved, beat in eggs, then cottage cheese, baking soda, and vanilla. Stir in flour, oats and other grains/nuts, raisins and finally chocolate chips. Dough should be stiff.

Drop by spoonful onto pan and bake at 350°F for 8 min. Cool on pan.

Yogurt Smoothie

1 cup	Yogurt	250 ml
¼ cup	Skim milk powder	60 ml
1 tbsp	Wheat germ	5 ml
1 cup	Banana, orange, berries, melon	250 ml
½ cup	Juice or milk	125 ml
2-4 tbsp	Sugar	30-60 ml

Whirl all ingredients together in a blender and enjoy. You can pretty much add any combination of fruit and liquid as suits your taste. Watermelon is excellent as is orange and banana or strawberries and banana. Try pineapple and coconut extract too. This is an excellent post workout drink.

APPENDIX III DIETARY INTAKE - How Much?

When a person performs strenuous work such as tree planting, more fuel is needed over and above the amount used in non-planting life. A very rough estimate of the number of calories consumed during physical work/exercise can be made as follows:

1. **Take body weight in kg (including bag weight) and multiply by the number of hours of activity (the number of hours spent planting, NOT including travel time or time spent waiting for trees or for a ride to the next block).**
2. **Multiply that number by an Intensity Factor from the table below. Planters who *don't want to lose weight* must add these calories to the amounts they normally eat.**

Intensity	Women	Men
Easy aerobic (Walking into the block, loading trees into bags)	(3)	(5)
Moderate aerobic (Planting at a comfortable pace, breathing deeply but still able to carry on a conversation)	(4)	(6)
Hard (Planting on steep ground with heavy bags, lhard screefing, breathing very deeply)	(5)	(7)
Maximal (Planting very fast and hard, breathing hard as if running fast)	(6)	(8)

According to the Dietary Reference Intakes, for calorie intake during normal life, men aged 19-24 need 3000 kcal/day on average and women in the same age group need about 2000 kcal/day. Look in the table below to get an idea of the total calories needed by planters during a day where actual planting time works out to 6 hours. For weights I have added 10kg for bag weight to body weight. In reality, a planter would probably plant 4-5 hours at easy aerobic pace, ½ - 1 hour in moderate, and ½ - 1 hour in hard to maximal for highballers. Planters who prepare for the season by doing the tree-planter fitness program (*http://online.selkirk.bc.ca/treeplanting*) will be able to spend more time at the higher intensities, allowing them to plant more trees.

Intensity	Women (70 kg)	Men (90 kg)
Easy aerobic	3*70*6 = 1260 +2000 = 3260	5*90*6 = 2700 +3000 = 5700
Moderate aerobic	4*70*6 = 1680 +2000 = 3680	6*90*6 = 3240 + 3000 = 6240
Hard	5*70*6 = 2100+2000 = 4100	7*90*6 = 3780 + 3000 = 6780
Maximal	6*70*6 = 2520+2000 = 4520	8*90*6 = 4320 + 3000 = 7320

In actual practice, male planters generally eat about 5000 kcal and lose weight, while women eat about 3500 kcal and don't.

You can use these numbers when menu planning. For example if you want to be sure the women have enough CHO then calculate 70% of 3500 kcal = 2450 kcal of CHO. The table below lists what a female planter might eat on a typical planting day in a camp with a cook. The numbers for Total Calories and CHO Calories can be found in many books, on the internet or from a dietary analysis program.

If a planter eats:	Total Calories	CHO Calories	%CHO
2 English muffins with jam	350 kcal	320 kcal	90%
2 pancakes (low-fat)	150 kcal	105 kcal	70%
1 cup skim milk	90 kcal	50 kcal	60%
1 cup of yogurt	160 kcal	36 kcal	22%
1 peanut butter and jam sandwich	200 kcal	100 kcal	50%
3 pieces of fruit	300 kcal	300 kcal	100%
½ cup carrot sticks	25 kcal	25 kcal	100%
1 low fat muffin	150 kcal	105 kcal	70%
2 squares/cookies (low fat)	200 kcal	100 kcal	50%
2 cups minestrone	200 kcal	150 kcal	75%
2 slices fresh bread	200 kcal	150 kcal	75%
2 cups of pasta with beef tomato sauce	800 kcal	400 kcal	40%
2 pieces garlic bread	150 kcal	100 kcal	75%
1 cup salad	50 kcal	40 kcal	80%
1 piece of cake	230 kcal	190 kcal	68%
4 L Gatorade 2	40 kcal	240 kcal	100%

This planter would be getting 2340 kcal of CHO out of a total of 3540 kcal or 66% CHO, which is just about right.

By the way: A kcal = Calorie, or 1000 calories. In common use the "k" is ignored and "calorie" is used interchangeably with Calorie or kcal)

APPENDIX IV THE 3 TYPES OF FOODSTUFFS

CARBOHYDRATES

Carbs are energy foods. They are the main fuel if you want to go fast or generate power. They are also the only fuel that the nervous system (brain and nerves) and the immune system (white blood cells) can use. Without adequate CHO you can't concentrate, you lose coordination and feel irritable (more than usual), and you can't repair damaged tissue or fight off infections.

The good news is that CHO are easy to digest. The bad news is that the body has very limited capacity to store CHO. **Glycogen,** the storage form of CHO, is found in 2 locations: Muscle and liver. The glycogen in muscle provides fuel for moderate to intense work and stokes the fire when burning fat. **You must have CHO to burn fat!** With a good diet there is enough CHO in muscle to last for around 100 min of activity (longer if the work intensity is lower; shorter if the work intensity is higher). This CHO stays in the muscle and is never released back into the blood, so the only sources of CHO for the nervous and immune systems are dietary intake and liver stores. Liver stores are depleted overnight, which explains why your Mom always told you to eat breakfast and why **planters need to eat in the block!**

Not all CHO are the same. The simplest forms are sugars, and glucose is the form of sugar that is used by the body's cells directly. Most CHO in foods are not simple; starch is made up of long chains of glucose units. Generally, the less processed the food, the more fiber is present, and the more difficult it is for our digestive tract to free the glucose units. Again, this can be good or bad, depending on your energy needs at any given time.

If you need energy NOW, you need a simple form of carbohydrate - either sugar, or easily digested starch such as white bread. But most of the time we don't need a huge amount of energy all at once and complex, high fibre carbs that release their glucose units slowly can give you a nice steady supply of energy that you can use a bit at a time. Including a bit of protein along with the CHO also helps to slow digestion and provide that necessary, steady supply of glucose.

When planning a meal it's useful to have an idea of how quickly the glucose in a particular food will be released. One system that has been developed to provide this information is the **Glycemic Index**. This index is a tool for estimating how quickly glucose enters the blood, and while it can be useful for choosing CHO foods, it's also important to understand that it is not an exact measure. The number assigned to a particular food varies with the method used to release and measure the glucose units. It also depends on how a food is prepared and which other foods are eaten at the same time (check out Appendix XIII for more information on the Glycemic Index).

Since the body is so dependent on glucose, its level in the blood is very tightly controlled. This is where it gets a bit complicated. When glucose levels rise too high too quickly, such as after eating a sweet treat (with a lot of simple sugars in it), the hormone insulin is released into your blood. Insulin increases the movement of glucose from the blood into cells all over your body, so that it can be stored. Insulin also causes excess glucose to be converted and stored as fat.

Unfortunately, the amount of insulin released is in response to the highest blood glucose level. This means that when blood glucose rises very quickly and sharply, a lot of insulin is released and a lot of glucose is removed from the blood and stored in cells. This is why you feel tired and can't concentrate about 2 hours after a meal rich in sugars, the glucose that your nervous system needs has been stored away.

Now we can use this effect to our advantage, because it's actually pretty hard to get CHO into muscle for storage. Physical work of more than 60 min on four successive days will gradually use up the CHO stored in muscle and leave a planter tired and unable to generate power at the end of a shift. But, if planters take in high Glycemic Index foods that stimulate insulin release immediately after work, CHO will go back into the muscle much more effectively. **For 1 - 2 hrs following exercise** the enzymes that store glucose in muscle are turned on, and so it is very important **for planters to eat CHO** which stimulate insulin release (high Glycemic Index foods) within that time frame. See appendix VIII for a list of high Glycemic CHO. This is really the ONLY time that you want insulin around.

During exercise when we are burning a lot of fuel there are other hormones in the bloodstream that prevent insulin from being released. (These hormones are called Glucagon, Adrenalin and Cortisol, and they act to make sure that sugars, amino acids and fats are available as fuels). These hormones will block insulin if sugars are eaten **during or immediately prior (under 15 min) to exercise**. This is why it's effective to eat high Glycemic Index foods as snacks between bag-ups. They are digested and made available to muscle, nerves and immune cells quickly and effectively.

To summarize:

- Planters need to eat/drink about 1/2 gm high Glycemic Index CHO for every pound of body weight in the 1-2 hours following planting to restore muscle CHO levels. (This means a planter weighing 140 lb needs about 300 kcal of CHO; a planter weighing 180lb needs about 400 kcal.)
- About 60-70% of a planter's daily caloric intake should come mainly from low Glycemic Index foods to maintain muscle and liver CHO levels (see Appendix III).
- It's best to include a bit of protein and to choose complex CHO with fibre in them (lower Glycemic Index foods).
- Calculate the caloric contribution (kcal) of CHO by multiplying the weight in grams by 4. For example 100g of pasta dry weight (2 cups cooked) would provide about 400 kcal of which about 80% (or 320 kcal) is CHO. This type of information can be found in books of the nutrient composition of foods, on the internet or by using a nutrient analysis program. See also Appendix III.
- Simple sugars are absorbed in the intestine within minutes of consumption.
- Complex CHO that are less processed and higher in fiber (low Glycemic Index) are absorbed about 1 hour after consumption.

One last comment about CHO: Since the body has an absolute need for glucose, it will take drastic action **if the supply of CHO does not meet the demand. Muscle will be broken down in order to make glucose.** The result? The wasted look, with increased chance of injury and greater susceptibility to infection. If there is a cold or flu around you will catch it (oh what fun, planting with a head cold or stomach cramps!). By making sure you eat enough CHO each day, you can avoid muscle loss and plant hard all season long.

PROTEIN

Protein foods are also important for strenuous activity. They supply all of the **building blocks for tissues and the enzymes** needed for every process in the body. Because of this role in tissue building and repair, protein requirements are increased slightly when planting. During the first 1-2 hr after exercise there is an enhanced opportunity to provide building blocks to muscle. If High Glycemic foods are consumed, insulin may also stimulate protein uptake into muscle.

Proteins are more complicated than CHO and thus the body digests them slower, taking about 2 hr to break them down. The presence of **protein will slow the digestion of CHO**. Unfortunately, many sources of protein include fat or are prepared with fat added, so not all sources of protein are equal (see Appendix I for some suggestions as to how to reduce the fat required to prepare your favorite recipes).

Protein plays another important role: Because a constant source of glucose is so essential to body function, protein can be broken down and converted to glucose in the absence of adequate CHO. This is what causes muscle wasting later in the season. The best way to prevent it is to be sure to eat enough CHO during heavy periods of activity, especially when putting in long days.

To Summarize:

- Consume 1.5-2.0 gm of protein/kg body weight in total each day (15-20% of total caloric intake or about 500 kcal of protein if a planter weighs 60kg, and about 650 kcal of protein if someone weighs 80 kg). This is easily provided even if a planter follows a vegan diet (with no foods from animals).
- Include 1/8 gm of protein for every pound of body weight in the post-planting snack (about 100 kcal)
- Calculate the kcal of protein by multiplying the number of grams by 4
- Include a small amount of low-fat protein in most meals and snacks

FATS

Fats are much denser in energy than either protein or CHO. One gram of fat will generate 9 kcal, more than twice that of protein or CHO (one pound of fat generates 3500 kcal). **Fats also take longer to digest (3 hr) and will slow down the digestion of other foods.** For concentrated energy there is no better source, but you have to have time to use them.

Fats also provide some very important nutrients. The 4 vitamins (A, E, D, and K) cannot be absorbed without fat and there are also **essential fatty acids** that are necessary for many important functions like blood clotting, immunity, and tissue repair. These fatty acids are also known as omega-fatty acids, and there are two main types. Omega-3 fatty acids are found in cold-water fish, canola, walnuts, and flax; omega-6 fatty acids are in most vegetable oils. Expensive oils aren't necessary. Good old canola has just about the perfect balance between omega-3 and -6.

It's a misconception to think that planters need a lot of fat to get enough calories to fuel planting. Hopefully by now you are starting to see that it is not so much the total number of calories, but rather **providing enough of each of CHO, protein and fats, and at the right time that will make a well fuelled and productive planter.**

To Summarize:

Ensure muscle CHO is restored at the end of the day by consuming a high CHO snack within 1 hour of finishing planting.

Use fats sparingly, favoring unsaturated and omega fatty acid sources. Use saturated fats (mostly from animal sources) and trans (from hydrogenated oils) for accents rather than staples. Your heart and blood vessels will appreciate it - and so will your waistline!

Check out the training program for tree planting at *http://online.selkirk.bc.ca/treeplanting* for ways to increase the ability of your muscle to burn fat.

APPENDIX V DIETARY INTAKE - Fat or Carbohydrate?

When physical workloads are high, the fuel of choice is always CHO - fats just can't be burnt fast enough to meet the needs of muscle. Unfortunately though, we don't store much CHO, not nearly as much as we store fat. So we need to replace the CHO daily, and this is hard to do.

There are 2 ways to improve CHO replacement: The first is to consume CHO immediately after stopping work; the second is to make sure that CHO make up 60-70% of the total daily caloric intake. To increase CHO content of a meal you will need to decrease fat content. See appendix I for suggestions on cooking with a minimum of fats.

Now nobody wants to spend time actually weighing food and figuring out the numbers, so how do you know what makes 70% CHO? Well, if you follow the recommendations given in this manual for breakfast, lunch, snacks, and dinner you will get enough CHO. Using the guidelines in Appendix I will give you a 15-20% contribution by fats, which is just what is needed.

If you want to calculate it yourself, read Appendix III and measure all amounts of foods - or use one of the commercial diet analysis programs. (I have one, so if you would like to have a few of your own recipes checked out, or see how what you eat in a typical day measures up, just e-mail the recipe or a daily food record and I will run the nutrient analysis program for you. Email me at *droberts@selkirk.ca.*

There is no evidence that consuming a high-fat diet improves endurance performance. Even the leanest of us has ample fat stored. Plus, fats are so high in calories that if fat intake is increased it's very difficult to eat enough CHO to replenish stores, leaving planters open to fatigue, injuries, and illness. Remember that **the nervous and immune systems require glucose as fuel, and glucose can only be obtained from CHO, or by degrading body proteins.**

There is also no real evidence that high protein and fat/low CHO diets result in increased weight loss. If we consume a little more CHO than our bodies need, exercise will burn this up nicely (CHO goes to fuel easier than to storage). On the other hand, if we consume even a little more fat than is needed, it goes very easily to storage.

For optimal health and performance the choice is a diet lower in fat (15-20% of caloric intake) but high in vegetables, whole fruits, and whole grains, plus protein to a maximum of 2 gm/kg body weight/day (15% of caloric intake). Polyunsaturated and omega fatty acids fats are necessary, and can enhance health. So choose to get your fats from cold-water fish like salmon and tuna, flax seed oil and olives and nuts, and canola or olive oil for cooking.

APPENDIX VI VITAMINS and MINERALS

Most vitamins and minerals are required in only very small amounts. **A normal mixed diet with a variety of fresh fruits and vegetables, whole grains, milk products (for calcium), and meat tor vegetarian alternatives will provide an ample supply of all of the known vitamins and minerals**, as well as the protective substances that are still being identified.

The requirement for B vitamins is increased with increased levels of physical work, but supplements are not usually needed since whole grains can supply ample amounts of these vitamins. With the increased intake of CHO by people who get a lot of exercise it all works out nicely.

Everyone needs to ensure adequate calcium intake (about 1000mg per day) for maintenance of bone mass, although this becomes especially important for anyone on a low-calorie diet and for women. Once women reach menopause and estrogen production drops, calcium is lost from bone. Even though their hormone levels do not drop off so radically, older men also lose bone. This is why building up as much bone as possible before mid-life helps to prevent osteoporosis. Unfortunately, calcium rich dairy products also often have high fat content as well, so look for fat-reduced versions of milk, yogurt, and cheeses.

The increase in oxygen consumption during exercise can generate increased reactive oxygen species such as free radicals, so there may be an increased need for antioxidants, such as Vitamins A, C, and E, Beta-carotene, and selenium. A need for supplements, has never actually been demonstrated though, because the production of antioxidants inside your own body is also greatly increased by aerobic exercise. The nice thing about these antioxidants is that they are produced in the exact location where the reactive oxygen species are located, providing the best possible protection. Again, as long as there is a supply of the necessary building blocks through lots of fresh fruit and vegetables, the body can generally make what it needs better than any scientist can do in the laboratory.

Iron is one nutrient that active people may not get in sufficient quantities from food. It's important for transporting oxygen in the blood and muscle and for converting food energy into a form used by muscle. Iron is lost in sweat and is difficult to absorb from food, especially if red meat isn't eaten regularly. And menstruating females have a monthly loss of iron in blood. About 30% of planters and athletes have low iron stores.

If you suspect you may be deficient in iron, ask your doctor for a blood test to determine serum *ferritin* levels. It should be about 20-30 μg/L. But never take an iron supplement without knowing whether you need it - **too much iron can be toxic.**

What you can do is to make sure you get the best supply of dietary iron possible. The iron in red meat (called heme iron) is especially well absorbed. Only small amounts of red meat 3x/week (just a little in stir fry or pasta sauce for non-vegans), are necessary. When non-heme iron is eaten it can be hard to absorb. Tomato sauce, orange juice or other Vitamin C rich foods can help with iron absorption. Avoid tea, coffee or milk at your iron rich meal, they can block iron absorption. Cooking in cast iron, and adding raisins and dark green veggies to a meal can also help vegans take in iron.

The increase in CHO intake from fruit and vegetables helps replenish minerals lost in sweat, as well as any additional need for other vitamins and trace elements. There is usually no need for supplementation if a planter eats enough wholesome foods to meet requirements for energy.

APPENDIX VII NUTRACEUTICALS and SUPPLEMENTS

CREATINE

Creatine is a normal component of protein synthesized within our bodies and obtained from meat in the diet. It is used by muscle to store very short-term energy (30 sec). Creatine monohydrate supplementation has been shown to improve performance in very short duration activities, but not in endurance events. At this point there have not been any long-term studies to determine the health effects of taking high levels of creatine for extended periods of time. It is very unlikely that creatine would help tree-planters, but very likely that it is a moneymaker for the companies that sell it!

ECHINACEA

Echinacea is one of the few herbal remedies that have been shown to have an effect in properly controlled scientific studies. It increases the ability of white blood cells to kill infectious organisms, especially right after exposure to a bug. Be aware though that it loses its effectiveness if you take it too long and too often (more than two weeks at a time).

GLUCOSAMINE

This supplement is a type of modified sugar that is needed to make cartilage. There are some good studies that have shown glucosamine sulfate may help cartilage cells grow better. It takes some time though, before cartilage repair is increased, and the supplement should be taken continuously. Warning: One study suggested that this supplement could exacerbate blood sugar problems for people at risk for Type II diabetes.

GINSENG

There are no controlled studies (where the participants did not know whether they were getting Ginseng or placebo) that show a positive effect of Ginseng on performance. Also as with all herbal supplements, there are wide variations in the contents of different preparations even within Chinese ginseng (Eleutherococcus senticosus) and Siberian ginseng (Acanthopanax senticosus) also known as Ciwujia.

EPHEDRA

Mahuang or Chinese ephedra (Ephedra Sinica) contains ephedrine and related compounds that have stimulant effects similar to those of adrenaline (epinephrine). These drugs make one feel energized, but no studies have demonstrated that ephedra actually improves exercise performance. On the down side, ephedra has a number of rather nasty side effects. Ephedrine raises body temperature and increases the risk of developing a heat injury during exercise in warm weather. Other adverse side effects of ephedrine use include increased blood pressure, heart rate irregularities, insomnia, nervousness, tremors, headaches, psychoses, seizures, heart attacks, strokes, and death. Young healthy people taking this drug have experienced dizziness, lack of focus, irritability, and heart palpitations.

To sum up: Lots of risks and no proven benefits.

APPENDIX VIII GLYCEMIC INDEX

The **Glycemic Index (GI)** is a tool for **estimating how quickly glucose enters the blood** following a meal. After you eat something, it not only has to be broken down in your stomach and intestines, but it must also be absorbed into your blood, and then further processed in your liver. The simpler the food, the faster this happens, but a number of things influence the speed of each step:

The **type of food**: Carbohydrate is readily broken down to glucose; protein is more complicated but can yield glucose under the right conditions. Fat in a meal will slow the digestion process of all food types, but fat can not be converted to sugar.

The **amount of fiber** in the carbohydrate (fiber is not digested and slows the process).

The **combination of foods** (fat and protein in food slows down digestion).

The **degree of processing** in preparation (peeled, liquefied and/or well-cooked foods are digested more quickly).

The **amount of food eaten** (A large meal leaves the stomach slower than a small meal).

Foods rated from 60 - 100 are absorbed very quickly. Choose these foods for eating in the block or immediately after planting. If you want to eat them at another time, you can lower their GI by combining them with some protein and/or a little fat or eating them raw rather than cooked (e.g. carrots). Pasta cooked "al dente" has a lower GI than pasta cooked until very soft.

Foods rated from 40 – 59 are ranked as moderate Glycemic Index. Moderate and low Glycemic Index foods (below 40) are better choices most of the time: The fuel in these foods is released more slowly and will thus last longer. When glucose is not released all at once, there isn't as much insulin released, either (see Appendix IV for more information on insulin). It is healthier to avoid the release of large amounts of insulin, except immediately following hard exercise.

It's important to remember that the Glycemic Index ranking is only a guideline. Sometimes the same food will be given different ratings in two different sources (some scales compare foods to white bread, while others use glucose as a reference). Use the Glycemic Index as just one part of the total picture presented in this manual. Here are some examples of foods in each category:

HIGH GLYCEMIC INDEX FOODS 60 - 100 GI (g)		MODERATE GLYCEMIC INDEX FOODS 40 - 59 GI (g)		LOW GLYCEMIC INDEX FOODS Less than 40 GI (g)	
COOKIES					
Arrowroot	64	Oatmeal cookie	59		
Digestives	63	Power bars	58		
Graham wafers	76				
Shortbread	64				
Vanilla wafers	79				
CORN PRODUCTS					
Corn chips	76	Frozen corn	48		
Cornmeal	69	Popcorn	55		
Taco shells	69				
CRACKERS					
Breton Wheat Crackers	61				
Melba toast	71				
Pretzels	83				
Rice cakes	85				
Rye crispbread	64				
Soda crackers	76				
Stoned wheat thins	69				
FRUITS AND FRUIT JUICES					
Apricots, canned	65	Apple juice	42	Apple	36
Banana, over-ripe	64	Appricots	57	Cherries	22
Cantalope	65	Banana, under-ripe	42	Dried apricots	33
Dates	103	Banana, ripe	54	Grapefruit	25
Pineapple	66	Fruit cocktail	56	Pear	36
Raisins	64	Grapefruit juice	49	Plum	39
Watermelon	72	Grapes	46	Prunes	15
		Kiwi	52		
		Mango	55		
		Oranges	49		
		Orange Juice	57		
		Papaya	58		
		Peach	42		
		Peaches, canned (solids+liq)	53		
		Pears	41		
		Pineapple juice	47		
GRAINS					
Couscous	62	Buckwheat	55	Barley	25
Millet	71	Bulgur	49	Rye kernels	34
Tapioca	82	Wheat kernels	45		

HIGH GLYCEMIC INDEX FOODS 60 - 100 GI (g)		MODERATE GLYCEMIC INDEX FOODS 40 - 59 GI (g)		LOW GLYCEMIC INDEX FOODS Less than 40 GI (g)	
BREADS					
Bagel (white)	70	Pita bread	59		
Commercial white	72	Pumpernickel bread	58		
Croissant	69	Wholemeal rye	57		
Crumpet	70				
English muffin	61				
Fibread	61				
High fibre crispbread	60				
High fibre white	70				
Light rye	69				
Stoneground wholemeal	62				
BREAKFAST CEREALS					
Cheerios	76	All Bran	51		
Corn Bran	76	Bran Buds	59		
Corn Chex	84	Frosted Flakes	55		
Corn Flakes	84	Oat Bran	51		
Cream of Wheat	67	Oatmeal-slow cooking	48		
Crispix	89	Red River Cereal	50		
Golden Grahams	73	Muesli	55		
Grapenuts	69	Special K	54		
High Fibre Cornflakes	75				
Instant oats	67				
Life	67				
Nutri-grain	66				
Puffed wheat	69				
Raisin Bran	73				
Rice Chex	91				
Rice Krispies	84				
Shredded Wheat	84				
Team	84				
Total	7 8				
Weetabix	75				
CAKES					
Angel food cake	68	Pound cake	55		
Donut	77				
CANDY					
Jelly beans	80	Chocolate bar	49		
Life Savers	70	Jam	51		
		Snickers	41		

HIGH GLYCEMIC INDEX FOODS 60 - 100 GI (g)		MODERATE GLYCEMIC INDEX FOODS 40 - 59 GI (g)		LOW GLYCEMIC INDEX FOODS Less than 40 GI (g)	
LEGUMES					
		Chick peas, canned	43	Black beans	30
		Green lentils, canned	53	Butter beans	33
		Kidney beans, canned	53	Cannellini beans	31
		Pinto beans, canned	46	Green lentils	22
		White beans canned (baked)	57	Kidney beans	27
				Lima beans	33
				Pinto beans	39
				Red lentils	26
				Soya beans	16
				White beans	31
				Yellow split peas	32
MILK AND PRODUCTS					
Ice cream	60	Custard	43	Chocolate milk	35
Frozen desert	115			Skim milk	32
				Soya milk	31
				Whole milk	30
				Yogurt, fruit	36
				Yogurt	14
MUFFINS					
		Blueberry	60	Oatmeal and raisin	54
		Bran	61		
		Carrot	63		
MISCELLANEOUS					
Cheese pizza	61			Pizza with everything	33
Cola	65				
Gatorade	78				
Waffles	78				
PASTA/NOODLES					
Macaroni & cheese	66	Capellini	46	Bean thread	26
		Cheese tortellini	51	Fettucini	32
		Instant noodles	48	Spaghetti (boiled 5 min)	32
		Macaroni+cheese+tomato	46		
		Rice vermicelli	59		
		Spaghetti (boiled 15 min)	44		
POTATO					
Baked	95	Potato chips	56		
French fries	76	Sweet potato	54		
Instant mashed	88	White, boiled	59		
White, mashed					

HIGH GLYCEMIC INDEX FOODS 60 - 100 GI (g)		MODERATE GLYCEMIC INDEX FOODS 40 - 59 GI (g)		LOW GLYCEMIC INDEX FOODS Less than 40 GI (g)	
RICE					
Polished rice	61	Basmati	58		
Rice crackers	85	Brown rice	55		
White rice	68	Parboiled rice flavoured mix	48		
		Wild rice	58		
SOUP					
Black bean	66	Lentil soup, canned	45	Tomato soup	38
Green pea soup, canned	67				
SUGARS					
Glucose	100	Lactose	49		
Honey	73				
Maltose	100				
Sucrose	65				
VEGETABLES		**VEGETABLES**			
Carrots	95			Green beans	30
Parsnips	92				
Peas	85				

GLYCEMIC INDEX

If you have questions or comments, contact Delia.

Phone (250) 365-7292

E-mail - *droberts@selkirk.bc.ca*

Or visit - *http://online.selkirk.bc.ca/treeplanting*