

Garlic Variety Demonstration Trial

2 Year Report

2012-2014

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Introduction

Garlic (*Allium sativum*) is a temperate climate crop which has growing interest throughout Alaska. It is a cultivated crop throughout the world but not in Alaska. Garlic does not tolerate extreme cold nor the freeze/thaw cycles that are experienced in Alaska. There are some growers in Alaska who have had good luck in growing a successful crop in Alaska. In Southeast Alaska several growers are able to get a successful crop due to their milder winters than the rest of the state. Others are able to successfully grow garlic by utilizing mulch protection during the winter months or they have adequate snow cover for additional ground insulation.

Garlic is described within two subspecies; *A. sativum* var. *ophioscorodon* known as hardneck varieties and *A. sativum* var. *sativum* known as softneck varieties. Hardneck varieties will produce a flower stalk called a scape. The bulb usually contains 4-10 cloves and is typically smaller than those of softneck varieties. Hardneck varieties are available in three types: Rocambole, Porcelain and Purple Stripe. Softneck varieties typically do not produce a flower stalk and their bulbs have smaller but more numerous cloves than the hardneck varieties. Each bulb could contain up to 20 cloves. The garlic commonly sold in supermarkets are usually softneck varieties due to their longer shelf life. Softneck varieties are available in two different types; Silverskin and Artichoke.

Garlic is usually planted in Alaska around the beginning of September. The cloves need approximately four weeks in the soil before the ground freezes in order for good root growth to develop before winter. The garlic bulbs need to be broken apart into individual cloves without damaging the outer skin of the cloves. This needs to be done within a couple of days of planting. Only large cloves should be planted to insure large plants and large bulbs the following year. The cloves need to be planted with the root end down. This is the end where the cloves are attached together.

Garlic prefers rich, well-drained soil but will adapt to many soil types. Garlic will develop rot in soils with poor drainage. Hardneck varieties require more nutrient management than the softneck varieties. When garlic plants emerge in the spring, they require water and nitrogen during this stage of growth. Well-established plants are required early in order for the energy to be directed to the bulb growth. If the plants are small and weak when the leaves stop developing, they will only produce small bulbs. Hardneck varieties will send up a flower stalk, or scape, in June. The scapes should be removed just above the top green leaf before they start to uncoil. This will redirect the energy to the bulb development. Scapes can be used in the kitchen for cooking.

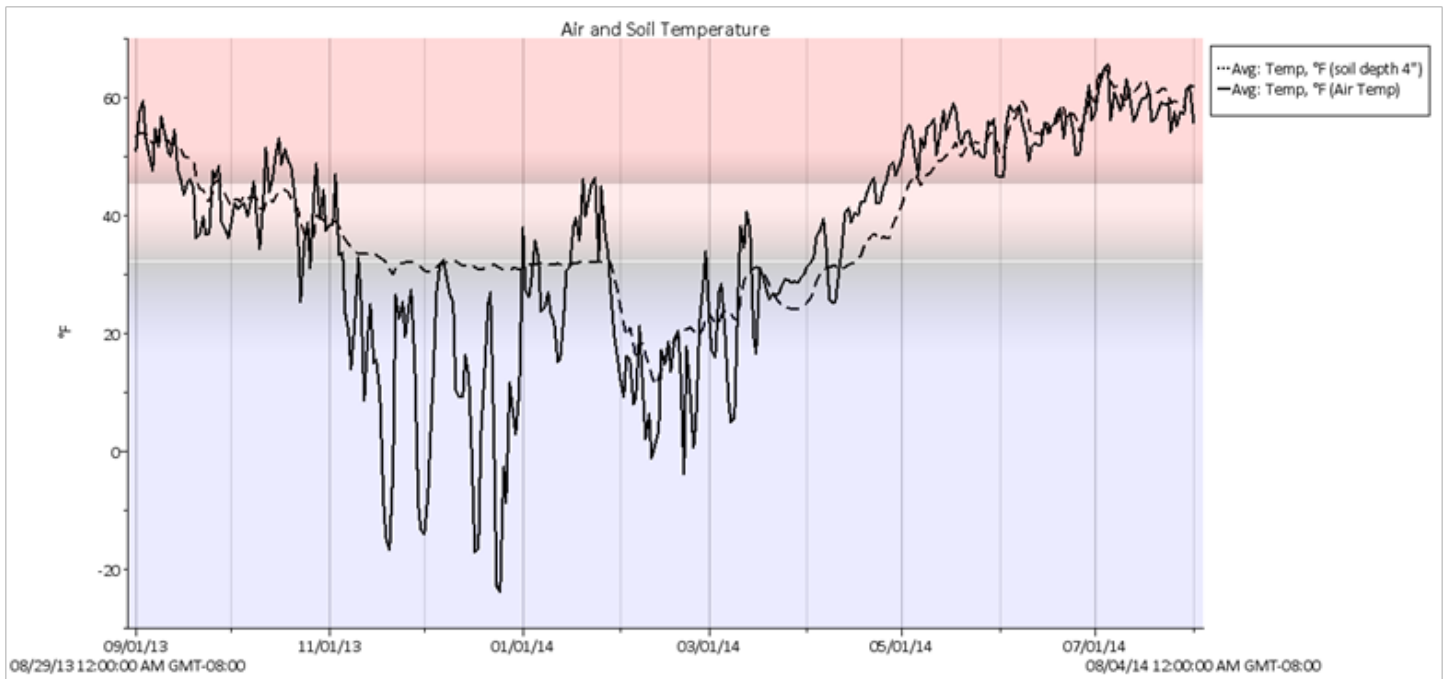
When the lower leaves have turned brown and there are 4-5 green leaves at the tops of the plants, the garlic is ready for harvest. Harvesting is best done by digging them up with a spade, fork or shovel. Pulling the garlic up by hand is not recommended for all varieties or soil types. The freshly dug bulbs should not be left in direct sunlight so they do not sunburn. The plants should be bundled in groups of 5 to 10 plants and hung in an area with good air circulation. After three to four weeks the plants and bulbs should cure completely and the stems and roots can be trimmed. Garlic should be stored in a cool and dark place. Storage times vary by the different types of garlic.

Overview

Different types of garlic were chosen for two separate growing seasons at the Alaska Plant Materials Center, located 5.4 miles south of Palmer. The soil is described as a Kidazqeni-Nikalson Complex. The varieties chosen for the 2013 growing season were; Silver White (Silverskin, softneck), S&H Silver (Silverskin, softneck), Susanville (Artichoke, softneck), Inchelium Red (Artichoke, softneck), Asian Tempest (Asiatic, hardneck), Korean Mountain (Asiatic, hardneck), Romanian Red (Porcelain, hardneck), Music (Porcelain, hardneck), Khabar (Marbled Purple Stripe, hardneck), Metechi (Marbled Purple Stripe, hardneck), Killarney Red (Rocambole, hardneck) and Martin's Heirloom (Rocambole, hardneck). Due to availability the varieties selected for the 2014 growing season were different; Idaho Silver (Silverskin, softneck), Nootka Rose (Silverskin, softneck), Susanville (Artichoke, softneck), Inchelium Red (Artichoke, softneck), Island Star (Artichoke, softneck), Basque Turban (Turban, hardneck), Romanian Red (Porcelain, hardneck), Georgian Crystal (Porcelain, hardneck), Khabar (Marbled Purple Stripe, hardneck), Metechi (Marbled Purple Stripe, hardneck), Brown Tempest (Glazed Purple Stripe), Chesnok Red (Purple Stripe), German Red (Rocambole, hardneck), Killarney Red (Rocambole, hardneck) and Martin's Heirloom (Rocambole, hardneck). The garlic was supplied by Filaree Garlic Farm in Washington. Air and soil temperatures

were only collected during the 2013-2014 fall planted garlic growing season (**Figure 1**).

Figure 1. Climate Data.



Methods

During the fall of 2012, twelve garlic varieties were planted in a randomized complete block design with four replications in single row plots, 5 feet long, with 32 inches between rows and 6 inches in-row spacing. A spacing of two feet was placed between repetitions. The area was tilled prior to planting. The cloves were separated prior to planting and the largest cloves were selected. The cloves were planted six inches deep the first week of September. During the spring of 2013, no leaves emerged from the planted cloves. Several cloves were dug to see if they showed signs of freezing during the winter. Every clove showed signs of freezing. Since none of the cloves survived the winter, a new location was selected. The site was chosen along a tree line with hopes of the ability to keep snow cover due to the high winds experienced at the PMC. The 2013 planting was done in the same manner but with fifteen varieties. They were planted during the first week of September. The buried cloves were checked after several weeks to see if root development had started. All of the cloves that were checked showed vigorous root growth. In the spring of 2014, as leaves began to emerge, a 20-20-20 fertilizer was applied by side-dressing the rows. The plot was watered with overhead sprinkler irrigation throughout the growing season. The scapes were removed from the hardneck varieties during the last week of June. All of the surviving garlic was harvested the last week of July and cured in a cool, dry location for four weeks. The stems and roots were removed after curing. The garlic was then counted and weighed.

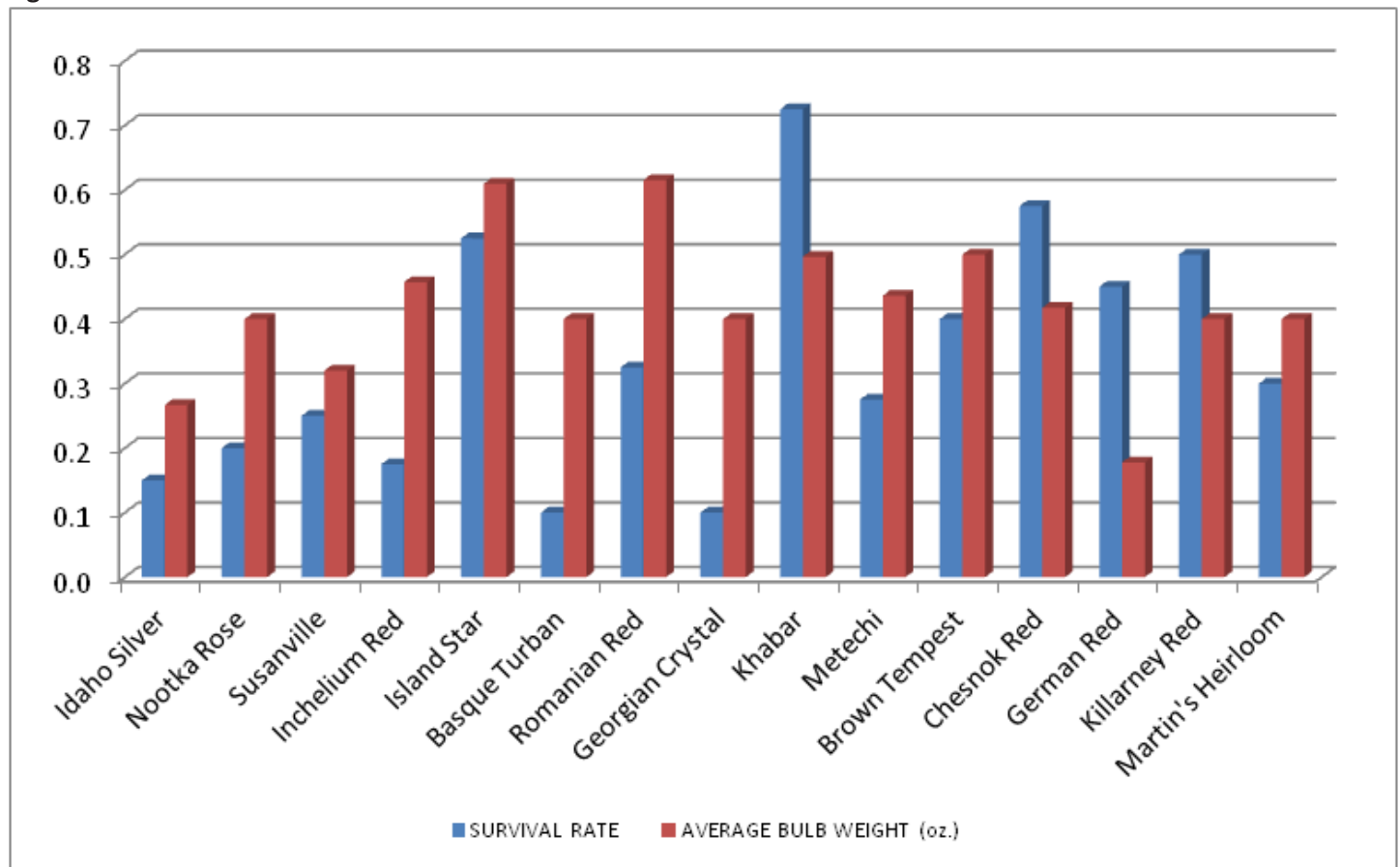
Results

The location of the 2012 fall planting was in a location susceptible to prevailing winds. The plot did not have snow cover for the entire winter. All of the cloves did not survive the winter. After relocating the planting site, we were able to keep a minimum of 4 inches of snow cover throughout the winter. Several of the selected varieties for the 2013 planting had a better survival rate than others as shown in **Table 1**. The sizes of the garlic bulbs were smaller than expected as shown in **Figure 2**.

Table 1. 2014 Garlic Harvest Data

VARIETY	TYPE		# HARVESTED	% SURVIVED	TOTAL WEIGHT (oz.)
Idaho Silver	Softneck	Silverskin	6	15	1.6
Nootka Rose	Softneck	Silverskin	8	20	3.2
Susanville	Softneck	Artichoke	10	25	3.2
Inchelium Red	Softneck	Artichoke	7	18	3.2
Island Star	Softneck	Artichoke	21	53	12.8
Basque Turban	Hardneck	Turban	4	10	1.6
Romanian Red	Hardneck	Porcelain	13	33	8
Georgian Crystal	Hardneck	Porcelain	4	10	1.6
Khabar	Hardneck	Marbled Purple Stripe	29	73	14.4
Metechi	Hardneck	Marbled Purple Stripe	11	28	4.8
Brown Tempest	Hardneck	Glazed Purple Stripe	16	40	8
Chesnok Red	Hardneck	Purple Stripe	23	58	9.6
German Red	Hardneck	Rocamboles	18	45	3.2
Killarney Red	Hardneck	Rocamboles	20	50	8
Martin's Heirloom	Hardneck	Rocamboles	12	30	4.8

Figure 2. 2014 Garlic Harvest Data



Conclusion

The winters in Alaska are very unpredictable. A crop of garlic grown in Alaska will need extra protection in order to survive the cold temperatures throughout the winter. Since snow cover is not a guarantee during the entire winter, an extra layer of mulch is highly recommended. The size of the garlic planting will determine if mulching is economically feasible. A couple of varieties did have a more than 50% survival rate without additional protection; Island Star, Chesnok Red and Khabar, with the latter having more than a 70% survival rate. The PMC has decided not to continue studying the survivability of garlic in Alaskan winters due to the high rate of loss experienced at our location. In the future, off-site trials may be of interest for the PMC to conduct.