

2004 Garlic Trial in Northeastern Illinois

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Interest in garlic production around the state of Illinois remains high and provides the incentive for the continuation of this research into the culture and suitability of numerous garlic cultivars for commercial production in Illinois. This work began with an extensive observation trial, harvested in 1998, which provided sufficient planting stock to initiate a replicated trial, located in Bonfield, in Kankakee County in northeastern Illinois, on dark brown sandy loam soil. In 2003, sixteen cultivars were added to this trial. Two additional cultivars are in the trial for the first time this year. Results from 2004, compared with the previous five-year averages (where available) follow.

Materials and Methods

Garlic cultivars were obtained from Filaree Farm in Okanogan, WA (*FF*), from John Swenson, garlic curator for Seed Savers Exchange (*SWE*), garlic grower W. Pat Gillen (*GIL*), or from the Hudson Valley Garlic Festival (*HV*). On October 27, 2003, in Bonfield, IL, four replications of 10 cloves of each variety were planted 3 inches deep and 4 inches apart in single rows 36 inches apart. Plots were 42 inches long, with all 20 varieties in a single row for each of the four replications. Ten pounds of 12-12-12 fertilizer per 1,000 square feet was incorporated prior to planting. On April 17, and again on May 15, 1 pound of actual nitrogen per 1,000 square feet, in the form of ammonium nitrate, was applied to the growing garlic. No irrigation, insect, or disease control was applied. Weed control was mechanical by hoeing and roto-tilling. Plots were harvested as varieties matured to the 4 green leaves remaining stage. Garlic was cured in an airy, dark barn until thoroughly dry. After curing was complete, roots and tops were trimmed, and bulbs counted and weighed. Average results for the four replications appear in Tables 1, 2, and 3 below. These are compared to the five-year average for the years 2000-2004.

Results and Discussion

Weather conditions at the trial site were generally favorable this year. After fall planting, soil temperature remained good for rooting and establishment of the cloves, well into December. During the early part of the growing season, weather was fairly normal. During the winter, very little snow fell, so that spring emergence occurred as soon as the frost left the soil in March. The summer was cooler overall than normal, with few days over 90° F, but with mild conditions in June and July. There were some minor problems with rain falling just prior to the digging season, but the bulk of the crop was harvested in excellent condition. Overall germination and survival to harvest of the cloves planted in the trial was good, with a few exceptions. Although the planting date was later than would be recommended in most years, soil and weather conditions in November allowed good rooting and sprout emergence.

As seen in Tables 1 and 2, 2004 yields correlate well with the weight per bulb and total weight per plot averages of the five previous years, although trending slightly lower. Music, which has topped this trial in every preceding season, was again atop the yield standings. Most of the other top performers from previous years returned to just below their 5-year average yield levels this year. Metechi fell off considerably from the five-year average, and FM-99 dipped below its one-year performance of 2003. In its first year, Frisco Red was a top performer,

finishing third in per-bulb weight and second in total weight per plot. The poor performers also averaged near their 5-year standard, and no one cultivar made a large jump, either up or down in the list. Other than the top five cultivars, Music, Georgian Crystal, Frisco Red, Carpathian, and Prussian White, the others in the top eleven were grouped closely together, without outstanding differences.

The top three cultivars in previous years, Music, Metechi, and Georgian Crystal, were in the top eight again this year. This year's rankings show Music, Georgian Crystal, Frisco Red, Carpathian, Prussian White, Persian Star, Northern White and Metechi as the top eight. The next grouping of FM-99, Swenson Porcelain, and Spanish Roja, complete the top eleven. Based on these results, the above varieties would be recommended for consideration, subject to local market acceptance. If softnecks are desired for braiding, Inchelium Red, New York Softneck, and Mediterranean are close behind the top grouping, of which FM-99 is the only softneck.

Ajo Rojo, a Creole type, did poorly again, as did Pride of Maine, Czech Red, German Red, Northe #3, and Chinese Purple. Unless one of these appeals to a local market, their lower yield would probably make them less profitable choices.

Table 3 shows the numbers of planted cloves surviving to be harvested as finished bulbs. Five cultivars fell well below the five-year average in survival, which is a cause for some concern. These would include Ichelium Red, normally 93% surviving, which managed only 58% this year, Chinese Purple, falling from 97% to 60%, Ajo Rojo, 98% to 63%, New York Softneck, 98% to 70%, and Romanian Red, 100 % to 78%. All others survived at 85% or better, which would probably be acceptable, although many fell off slightly from previous numbers. The highest figure of 105% would probably not include enough double bulbs to unduly affect the quality of the harvested crop. The narrow range of these percentages is due to the careful selection of cloves for planting, which do not appear to bear double shoots, and which have intact clove skins. These two selection criteria appear to result, almost exclusively, in single bulbs, which germinate and survive well. The five-year average survival percentages in Table 3 may be better predictors of which cultivars have a clear tendency to produce multiple growing point cloves.

In addition to repeating the replicated trial of 36 cultivars from 2003, an additional 2, Swenson Porcelain and Frisco Red, were added to the replicated trial, planted in October, 2003. Results from all 38 cultivars are listed in the following 3 tables. Average weight per bulb, total weight per plot, and number surviving are included. Both new entries performed well in their first year of inclusion.

Although bulb size and weight were down slightly in most varieties this season, a high percentage were of high quality and large enough to be sold as premium gourmet bulbs. This would again confirm that garlic production, especially of the hardneck types, could be successful in Illinois and around the Midwest. Music, Georgian Crystal, Frisco Red, Carpathian, Prussian White, Persian Star, Northern White, Metechi, FM-99, Spanish Roja, Bavarian Purple, Inchelium Red, New York Softneck, and Mediterranean have performed well enough to deserve a trial if local market conditions demand these types. Music, Georgian Crystal, Prussian White, and Northern White are Porcelain varieties, which are said to contain higher levels of allicin, an active medicinal component of garlic. Spanish Roja regularly wins or places very highly in taste tests around the country, and can be marketed by name as a "gourmet" item. Other Rocambole types on this list include Frisco Red and Carpathian. Local markets may prefer the look or taste of one of these over the others, so polling the consumers in the intended markets can also help growers make variety choices. Cultivar classification, as to type, where known, and source are listed in Tables 4 and 4a.

Table 1. 2004 Garlic Cultivars, Ranked by Average Weight per Bulb

Cultivar	Avg. Number	Avg. Total Wt. (oz)	Avg. Wt/Bulb (oz)	5 year Avg Wt/Bulb
Music	10.0	25.3	2.5	2.7
Georgian Crystal	9.8	22.3	2.3	2.4
Frisco Red	10.3	22.5	2.2	N/A
Carpathian	10.0	20.8	2.1	2.0
Prussian White	10.0	20.5	2.1	*1.9
Persian Star	10.0	19.3	1.9	2.0
Northern White	10.0	19.0	1.9	*2.0
Metechi	10.0	18.8	1.9	2.4
FM-99	9.3	16.3	1.8	*2.3
Swenson Porcelain	9.8	16.5	1.7	NA
Spanish Roja	10.0	15.5	1.6	1.8
Bavarian Purple	8.8	13.8	1.6	*1.7
Inchelium Red	5.8	8.5	1.5	2.1
New York Softneck	7.0	10.3	1.5	*2.0
Mediterranean	8.5	13.3	1.5	*2.2
Romanian Red	7.8	11.5	1.5	*1.3
Italian Purple	9.8	14.0	1.5	*1.6
Asian Tempest	9.0	12.5	1.4	1.6
Yugoslavian	10.0	14.0	1.4	1.6
French Red	9.8	13.5	1.4	*1.2
German Winter Hardy	9.3	12.3	1.3	*1.5
Russian Red	10.0	13.3	1.3	*1.4
Idaho Silverskin	9.8	12.5	1.3	1.6
Nootka Rose	10.5	13.5	1.3	1.5
German White	9.3	12.0	1.3	*1.6
Red Rezan	10.0	12.5	1.3	1.4
Early Red Italian	9.8	11.8	1.2	1.5
Pink Blush	10.5	12.8	1.2	1.4
Ukrainian	9.5	11.3	1.2	*1.1
Pitarelli	9.8	11.3	1.2	1.6
Brown Tempest	8.5	10.0	1.2	*1.3
Killarney Red	10.0	11.5	1.2	*1.2
Northe #3	9.5	9.8	1.0	1.2
German Red	9.8	9.3	1.0	1.3
Chinese Purple	6.0	5.0	0.8	1.2
Ajo Rojo	6.3	4.0	0.7	0.9
Czech Red	9.3	6.5	0.7	N/A
Pride of Maine	9.8	6.5	0.7	0.9

* Late entry, only one previous year's data

Table 2: 2004 Garlic Cultivars, Ranked by Average Total Weight

Cultivar	Avg. Total Wt. (oz)	Avg. Number	Avg. Wt/Bulb (oz)
Music	25.3	10.0	2.53
Frisco Red	22.5	10.3	2.20
Georgian Crystal	22.3	9.8	2.28
Carpathian	20.8	10.0	2.08
Prussian White	20.5	10.0	2.05
Persian Star	19.3	10.0	1.93
Northern White	19.0	10.0	1.90
Metechi	18.8	10.0	1.88
Swenson Porcelain	16.5	9.8	1.70
FM-99	16.3	9.3	1.78
Spanish Roja	15.5	10.0	1.58
Yugoslavian	14.0	10.0	1.40
Italian Purple	14.0	9.8	1.48
Bavarian Purple	13.8	8.8	1.55
Nootka Rose	13.5	10.5	1.30
French Red	13.5	9.8	1.38
Russian Red	13.3	10.0	1.33
Mediterranean	13.3	8.5	1.50
Pink Blush	12.8	10.5	1.20
Red Rezan	12.5	10.0	1.25
Idaho Silverskin	12.5	9.8	1.30
Asian Tempest	12.5	9.0	1.40
German Winter Hardy	12.3	9.3	1.33
German White	12.0	9.3	1.30
Early Red Italian	11.8	9.8	1.20
Romanian Red	11.5	7.8	1.50
Killarney Red	11.5	10.0	1.15
Ukrainian	11.3	9.5	1.18
Pitarelli	11.3	9.8	1.15
New York Softneck	10.3	7.0	1.53
Brown Tempest	10.0	8.5	1.15
Northe #3	9.8	9.5	1.03
German Red	9.3	9.8	0.95
Inchelium Red	8.5	5.8	1.53
Pride of Maine	6.5	9.8	0.68
Czech Red	6.5	9.3	0.70
Chinese Purple	5.0	6.0	0.80
Ajo Rojo	4.0	6.3	0.70

Table 3: 2004 Garlic Cultivars, Ranked by Average Number

Cultivar	Avg. Number	5 year Avg Number	Avg. Total Wt. (oz)	Avg. Wt/Bulb (oz)
Nootka Rose	10.5	10.7	13.5	1.30
Pink Blush	10.5	10.1	12.8	1.20
Frisco Red	10.3	N/A	22.5	2.20
Carpathian	10.0	10.1	20.8	2.08
Metechi	10.0	9.6	18.8	1.88
Music	10.0	10.1	25.3	2.53
Persian Star	10.0	9.6	19.3	1.93
Red Rezan	10.0	9.6	12.5	1.25
Spanish Roja	10.0	8.5	15.5	1.58
Yugoslavian	10.0	9.7	14.0	1.40
Killarney Red	10.0	*10.0	11.5	1.15
Northern White	10.0	*10.5	19.0	1.90
Prussian White	10.0	*10.0	20.5	2.05
Russian Red	10.0	*10.8	13.3	1.33
Early Red Italian	9.8	9.5	11.8	1.20
Georgian Crystal	9.8	10.0	22.3	2.28
German Red	9.8	9.9	9.3	0.95
Idaho Silverskin	9.8	9.7	12.5	1.30
Pitarelli	9.8	9.5	11.3	1.15
Pride of Maine	9.8	9.8	6.5	0.68
French Red	9.8	*9.8	13.5	1.38
Italian Purple	9.8	*9.8	14.0	1.48
Swenson Porcelain	9.8	N/A	16.5	1.70
Northe #3	9.5	10.4	9.8	1.03
Ukrainian	9.5	*10.0	11.3	1.18
Czech Red	9.3	N/A	6.5	0.70
FM-99	9.3	*10.5	16.3	1.78
German White	9.3	*9.0	12.0	1.30
German Winter Hardy	9.3	*8.5	12.3	1.33
Asian Tempest	9.0	10.5	12.5	1.40
Bavarian Purple	8.8	*10.3	13.8	1.55
Brown Tempest	8.5	*8.8	10.0	1.15
Mediterranean	8.5	*9.8	13.3	1.50
Romanian Red	7.8	*10.0	11.5	1.50
New York Softneck	7.0	*9.8	10.3	1.53
Ajo Rojo	6.3	9.8	4.0	0.70
Chinese Purple	6.0	9.7	5.0	0.80
Inchelium Red	5.8	9.3	8.5	1.53

* Late entry, only one previous year's data

Table 4. Garlic Cultivar Classification

Cultivar	Species/Subspecies	Variety/Group Name
Carpathian (FF)	<i>A. sativum ophioscorodon</i>	Rocamboles
German Red (SWE)	<i>A. sativum ophioscorodon</i>	Rocamboles
Pitarelli (SWE)	<i>A. sativum ophioscorodon</i>	Rocamboles
Pride of Maine(SWE)	<i>A. sativum ophioscorodon</i>	Rocamboles
Spanish Roja (FF)	<i>A. sativum ophioscorodon</i>	Rocamboles
Yugoslavian (FF)	<i>A. sativum ophioscorodon</i>	Rocamboles
Persian Star (FF)	<i>A. sativum ophioscorodon</i>	Purple Stripe
Red Rezan (FF)	<i>A. sativum ophioscorodon</i>	Purple Stripe/Glazed Group
Metechi (FF)	<i>A. sativum ophioscorodon</i>	Purple Stripe/Marbled Group
Northe #3 (SWE)	<i>A. sativum ophioscorodon</i>	Purple Stripe/Marbled Group
Georgian Crystal (FF)	<i>A. sativum ophioscorodon</i>	Porcelain
Music (HV)	<i>A. sativum ophioscorodon</i>	Porcelain
Early Red Italian (FF)	<i>A. sativum sativum</i>	Artichoke
Inchelium Red(FF)	<i>A. sativum sativum</i>	Artichoke
Asian Tempest (FF) Group	<i>A. sativum sativum</i>	Artichoke/Asiatic
Chinese Purple (FF)	<i>A. sativum sativum</i>	Artichoke/Turban Group
Nootka Rose (FF)	<i>A. sativum sativum</i>	Silverskin
Idaho Silver (SWE)	<i>A. sativum sativum</i>	Silverskin
Pink Blush (SWE)	<i>A. sativum sativum</i>	Silverskin
Ajo Rojo (FF)	<i>A. sativum sativum</i>	Silverskin/Creole Group

Table 4a. Additional Garlic Cultivar Classification

Cultivar	Species/Subspecies	Variety/Group Name
Killarney Red (HV)	<i>A. sativum ophioscorodon</i>	Rocamboles
Frisco Red (GIL)	<i>A. sativum ophioscorodon</i>	Rocamboles
Brown Tempest (HV)	<i>A. sativum ophioscorodon</i>	Purple Stripe/Marbled Group
German White(HV)	<i>A. sativum ophioscorodon</i>	Porcelain
Northern White (HV)	<i>A. sativum ophioscorodon</i>	Porcelain
Prussian White (HV)	<i>A. sativum ophioscorodon</i>	Porcelain
Swenson Porcelain (SWE)	<i>A. sativum ophioscorodon</i>	Porcelain
Bavarian Purple (HV)	<i>A. sativum ophioscorodon</i>	Not known
German Winter Hardy (HV)	<i>A. sativum ophioscorodon</i>	Not known
Italian Purple (HV)	<i>A. sativum ophioscorodon</i>	Not known
Romanian Red (HV)	<i>A. sativum ophioscorodon</i>	Not known
Russian Red (HV)	<i>A. sativum ophioscorodon</i>	Not known
Ukrainian (HV)	<i>A. sativum ophioscorodon</i>	Not known
FM-99 (HV)	<i>A. sativum sativum</i>	Artichoke
Mediterranean (HV)	<i>A. sativum sativum</i>	Artichoke
New York Softneck (HV)	<i>A. sativum sativum</i>	Artichoke
French Red (HV)	<i>A. sativum sativum</i>	Not known