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ABSTRACT

This research project investigated three spinaches varieties: Covair, 9262, and 9263. The purpose of this project using these varieties of spinach plants was to analyze which variety had a better productivity. There were two trials that were investigated in two different seasons. The first trial consisted of twelve pots, and each pot had a different number of spinach plants. The second trail consisted of three raised beds with a total of 27 pots, and each pot had a total of eight spinach plants. Furthermore, this investigation leads to another important purpose because a study of an organic treatment for flea beetles and beet army worm was implemented. The insecticide treatments only covered the first planting date (12/23/13) because insects were affecting the spinach plants. The organic pesticides used in this treatment were M-pede soap 2%, Spintor, and Aza-Direct 2% with a control in order to compare the different reactions of each treatment. This investigation concluded with some results that will be discussed in this report.

INTRODUCTION

Vegetables are the most important source of food for human beings, and spinach plants contribute with a lot of nutrients. According to a document published by the USDA "Spinach is best known as a source of iron, spinach also offers several other key nutrients. These include calcium, potassium, vitamins C, D, K, and B9 (folate)—as well as beta-carotene, a molecule our bodies use in making vitamin A (par. 2)." In this research, it is important to know what kind of spinach has better development, productivity, and resistance to insects and disease, to determine which variety is better for farm production. Also, spinach plants have problems during its development because there are insects that feed on them. Insects like flea beetles (*Alticini sp.*), and beet army worm (*Spodoptera exigua*) eat spinach leaves. The flea beetles and the caterpillar can destroy a plantation of spinach causing an enormous problem for many farmers. A website of the University of Illinois Extension states that "The adult flea beetles eat tiny, pin-sized holes in leaves of eggplant, radish, bean, potato, tomato, and pepper. Pits may be eaten into the leaves; these pits later turn brown. Spinach flea beetle adults and larvae eat larger holes in spinach (par. 2)." The beet armyworm can produce serious problem as well because its source of food are the green leaves. Kenneth A. Sorensen relates in a document that "beet armyworm is capable of destroying young plants (par. 11)." The two trials received compost tea as fertilizer. This compost tea provided nutrients for plant development. According to Cindy Salter, a researcher of compost tea, she states that "Compost tea contains a rich mixture of beneficial microorganisms, micronutrients, and other organic compounds that work together to revitalize the soil's natural biological process (par.2)." The fertilizer is very important for a plant for the reason that it helps to resist to many diseases. Using different insecticides will help to know how a problem of this kind can be controlled.

OBJECTIVES

- To identify what kind of spinach variety has a better productivity and development
- To study what kind of organic insecticide controls effectively Flea Beetles and/or Beet Armyworm

MATERIALS AND METHODS

This study evaluated the yield of three varieties of spinach cultivars (var. 9262, 9263 and covair) in winter (12/23/2012) and spring (2/23/2013). Three types of insecticides were applied: M-pede soap 2% (potassium salt of fatty acids), Spintor (spinosad), and Aza-Direct 2% (azadirachtin) on three varieties of spinach only in the first trial to see the effects of each insecticide (04/05/2013). The insecticides were applied two times every two weeks (04/15/2013 and 04/22/2013) and collected seven days after the insecticide was applied on each treatment on 04/22/2013 and 04/29/2013. Also, the trial was monitored every two days to see what kind of problems the plants were having while they matured. Data was analyzed using ANOVA to find differences on yield.

RESULTS

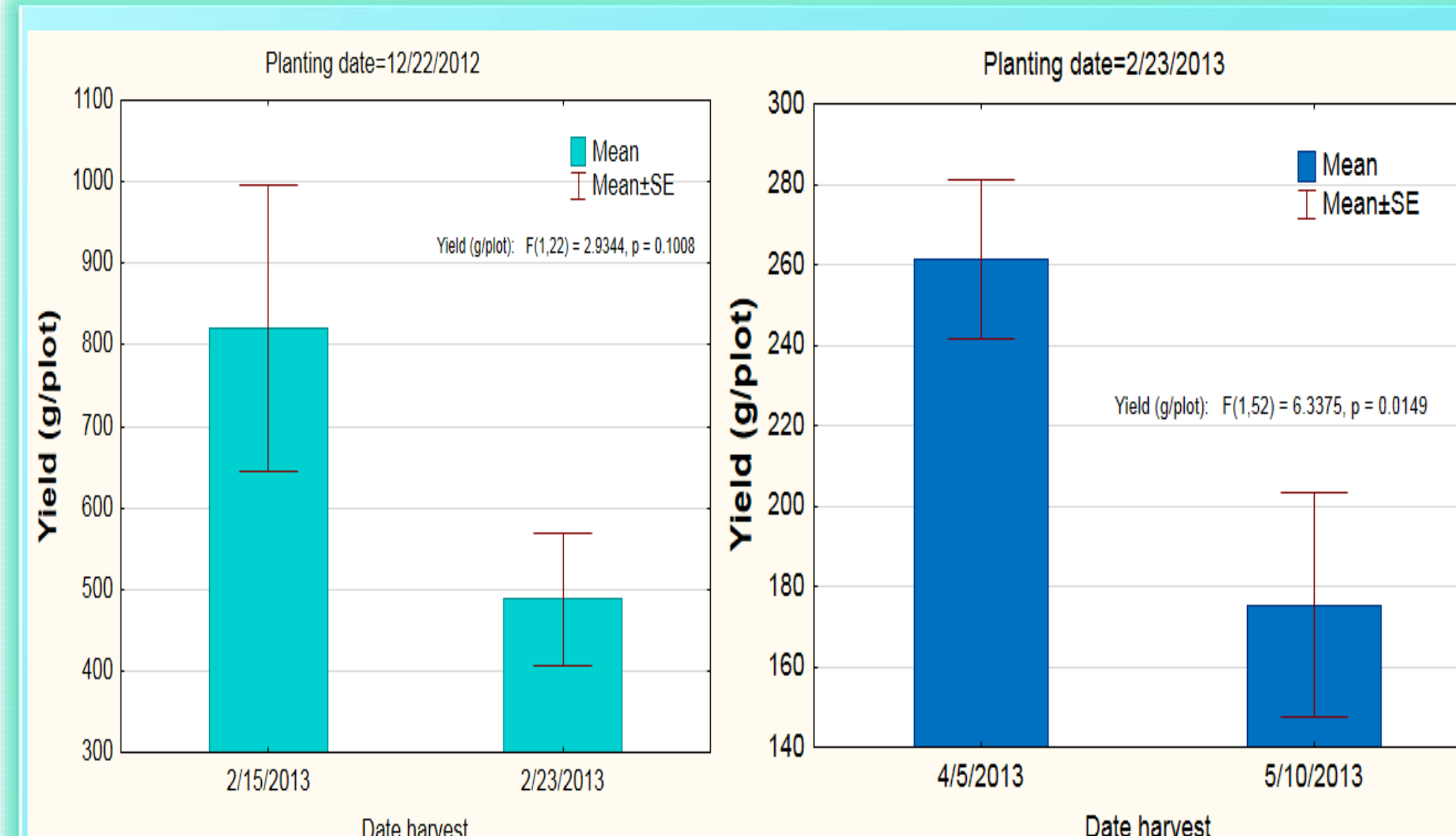


Figure 1 shows planting dates and spinach yields (grams). The first two bars from left to right show the first trial that was planted on 12/23/2012 (winter) and showed that the first cut always gives a largest yield. The second trial that was planted on 02/23/2013 is illustrated in the last two bars. It also showed that the first cut has a better yield than the second cut. The total cuts in each trial were two.

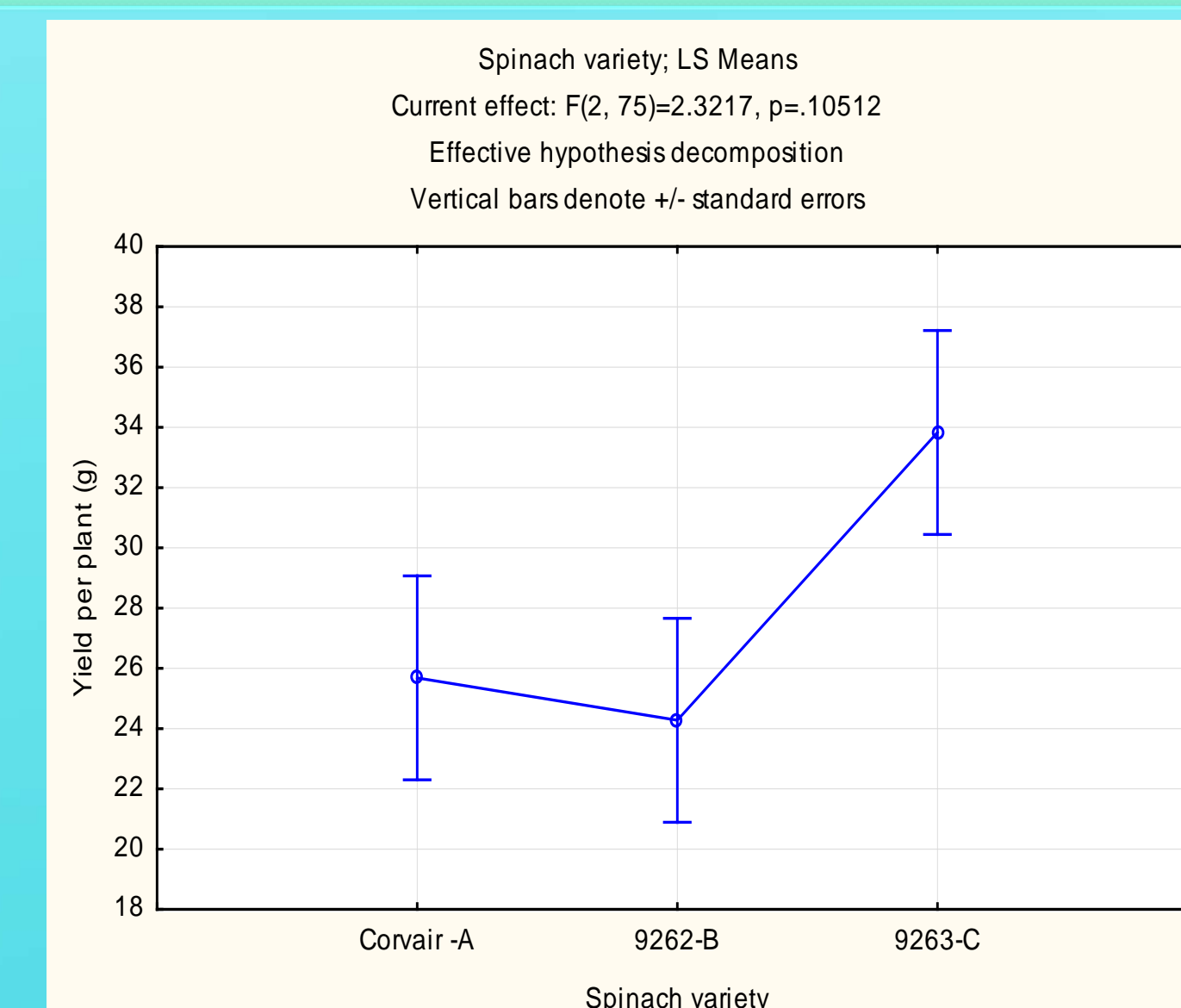


Figure 2 illustrates the spinach variety that was tested. This graph shows the yield obtained in both seasons. Covair and 9262 had almost the same amount of yield, but the variety 9263 was the one that stood out.

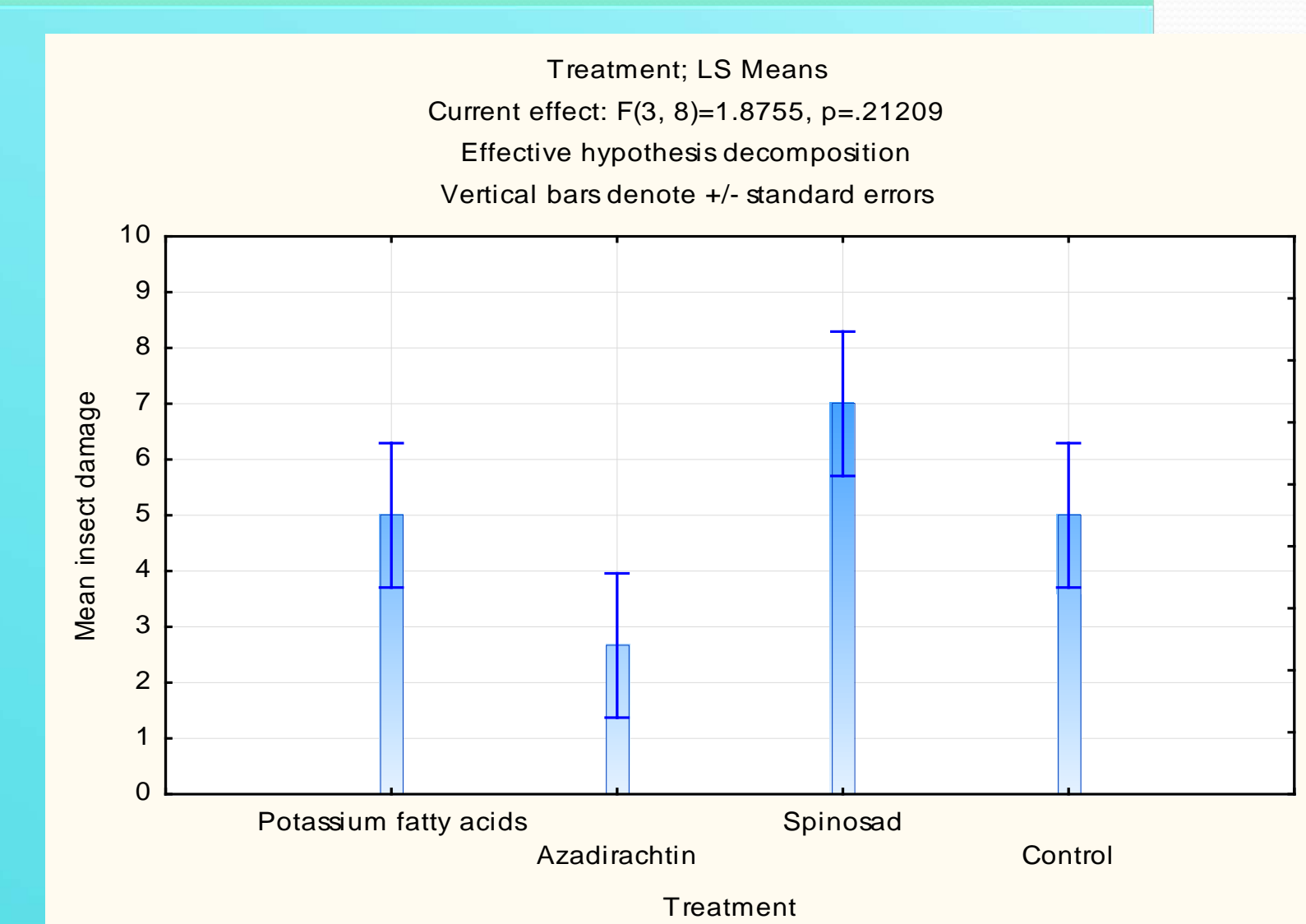


Figure 3 proves how the insecticide treatment had a different effect on spinach plants. The best insecticide to control flea beetles and beet armyworm was azadirachtin. Spinosad was not effective, spinach plants receiving this product had the highest damage in this study. All insecticides were applied twice.

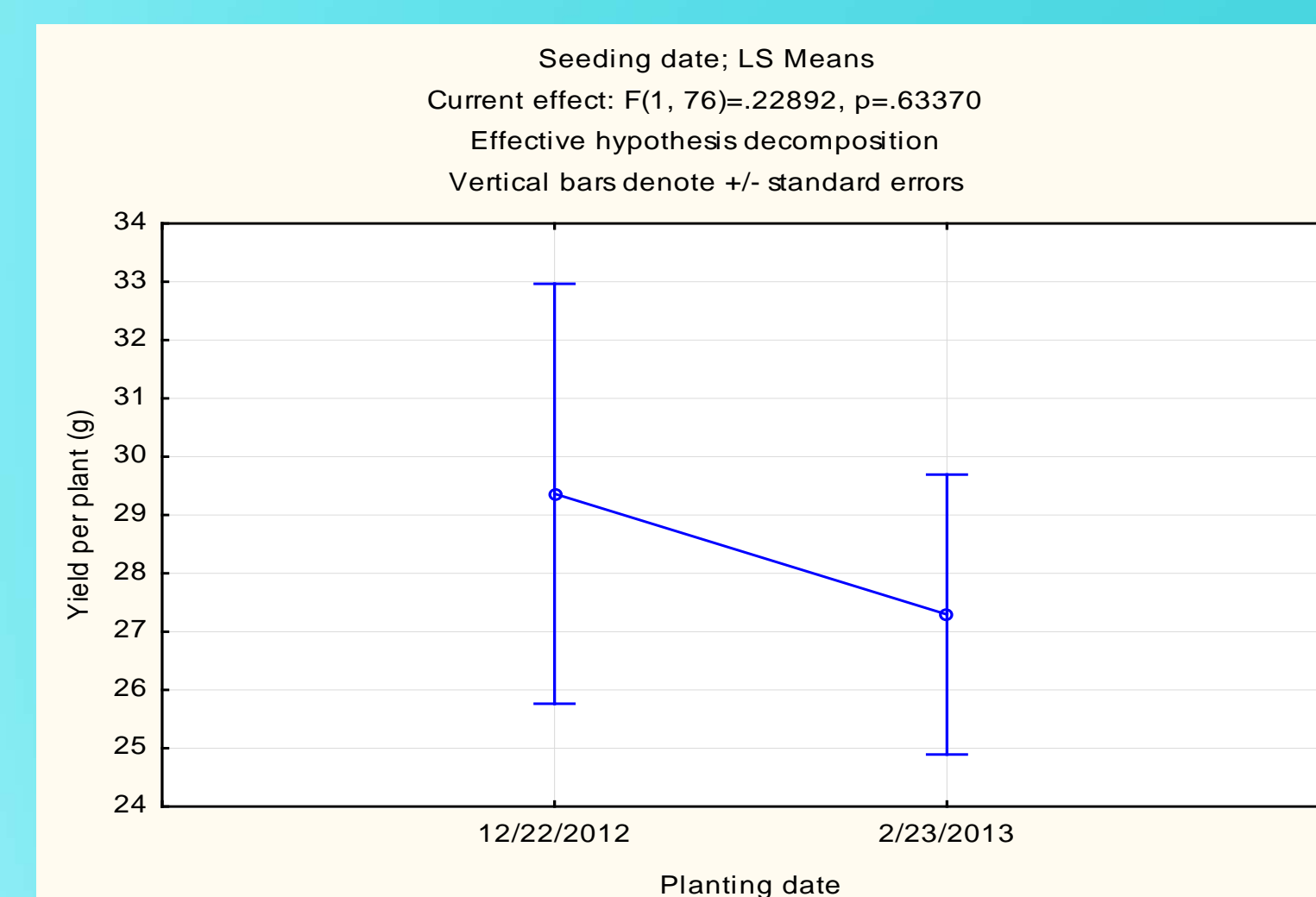


Figure 4 shows that the planting date on 12/22/13 produced better yields than spinach planted on 2/23/2013. This shows how spinach plants tend to have a better productivity on winter.



Image 1 shows when the spinaches started to grow up.



Image 2 shows spinach plants before harvesting



Image 3 shows insect damage

CONCLUSIONS

Spinach can be planted on winter or spring, however it is important to conclude that the first harvest produce higher yields compared to the second cut. Also, figure 1 shows that the second cut is lower than the first cut. Data from this study showed that the spinach variety 9263 was the most successful according to figure 2. The planting date also illustrates on figure 4 that planting on winter produced the highest yield incremented during this season. The treatment for flea beetles and beet armyworm concluded that azadirachtin was the better treatment to fight these insects.

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