At 5 weeks we transfer the tubes to a fresh container and add a fresh Previcur-water solution. At 10 weeks the tubes are again transferred to a fresh tray and the Previcur solution is replaced by a ½ normal strength nutrient solution.

The plants that have emerged can be planted out or left to grow on in the nutrient solution until required. From the appearance of the first plant to the last a period of 3 to 7 months can elapse.

CONTROL OF FUSCHIA RUST

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Abstract. In a comparative test a new product, Baycor®[1], significantly improved control of fuschia rust when compared with currently recommended Plantvax at single or double strength.

INTRODUCTION

Rust is a disease caused by fungi of the order of Uredinales in the Basidiomycetes characterized by a special type of reproductive structure. Being obligate parasites, rusts develop on living hosts. The pustules in which the rust spores develop provide that rusty look — hence the common term. The spores are easily spread by air movement and under suitable conditions rapidly penetrate a new host developing into new pustules in a week or so. In the case of fuchsias the rust is caused by a specific rust named *Uredo fuchsiae* Art. & Holw.

As with most groups of plant diseases, new strains of rusts may develop ability to resist available fungicides and so new strains of rust may appear on plants selected for their previous disease resistance.

In May, 1980 a rust infection of consequence was observed at the nursery and identified as *Uredo Fuchsiae*. The weather conditions at the time were excessively wet and warm, resulting in a significant commercial problem. There was a marked difference in cultivar susceptibility. For example, 'Pink Quartet' had quite severe infection and the newly introduced 'Bonanza' was extremely susceptible. 'Pixie', 'Lord Byron', 'Voodoo', and 'Party Frock' were infected but rust did not appreciatively affect appearance or growth.

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[1] Baycor®, registered trademark of Bayer Co.

Quantitative assessment of cultivars for susceptibility was made. 'Bonanza' had a high incidence of rust and severe defoliation.

'Pink Quartet'. 'Dark Eyes', 'Mission Bells' and 'Groovy' had medium incidence of rust and defoliation while 'Tuonella', 'Easter Bonnet', 'Pink Fairy', 'Winston', and 'Churchill' had rust affecting 3 to 5 leaves but little defoliation.

'Party Frock', 'Pixie', 'Voodoo' and 'Lord Byron' had rust affecting leaves but no defoliation.

With home gardening, rust is only a problem in fuchsias late in the growing season or during wet weather. A relatively simple control is to prune and destroy infected tissue.

In nurseries its effect on presentation and general health of the plant is of extreme commercial importance. Despite culling of the more susceptible cultivars, rust continued to be a problem of substantial consequence causing a reduction in sale value.

The advised control for fuchsia rust was Plantvax 75 w.p.; commercial dosage, 1.7 gm/l. This was used with adequate success in the 1980 growing season.

However, in the following year lesser control was obtained and plant quality suffered. It was subsequently advised that double strength Plantvax be used. This controlled the rust, however an unsightly deposit was left on the plants, lowering commercial appeal.

I decided to test Baycor 300 E.C. Its active constituent is bitertanol 300 g/l from the group of triazole fungicides, which are ergesterol inhibitors. It is of low toxicity to man and fish and has a recommended rate of application of 1.7 ml/l.

In reply to my request for information on conducting trials the importance of a logical approach was stressed to me. I was advised to define clearly —

1. The Aim.
2. The Reason.
3. The Method.

This involved — (a) how to do the work; and (b) how to assess the results.

MATERIALS AND METHODS

Firstly, tests were made on the phytoxicity of the product at ½, 1, and 2 times the recommended concentrations on all the cultivars available at that time, namely Bonanza, Display, Jube-lin, Fifi, Tuonella, City of Pacifica, Red Radar, Mrs. Rundle, Party Frock, Lord Byron, China Rose, Harbour Bridge and Jazz. These tests were carried out during the late seasonal

growing time and, in spite of high humidity and high temperatures, no phytoxicity was observed.

(i) **Selection of Plants**

Sixty already rust-infected plants of the highly susceptible Bonanza cultivar were graded into groups according to severity of infection and then randomised into 4 treatment groups of 15 plants each. Plants were grown in the open on a well-drained site. Pots were placed on black ground plastic and watered with Pope butterfly type sprinklers. Spray was applied by a Rega hand pump.

(ii) **Spray Treatments**

Plants were sprayed to run-off 4 times at ten day intervals and were protected from overspray. Treatments used were Baycor 300 E.C. (1.7ml/l); Plantvax 75 w.p. (1.3gm/l) and 2.6gm/l); and an untreated control. No surfactants were used.

(iii) **Assessment**

Assessments were made between 10 and 18 days after treatment. The main method used was visual grading from 0 (no infection) to 5 (maximum infection). Two observers acting independently rarely differed in their assessment of individual plants.

Other assessments were leaf drop, flower number, and area of pot covered.

RESULTS

The severity of rust infection in the untreated control plants remained relatively constant (Table 1). Baycor sprayed plants had less infection than those treated with either single or double strength Plantvax. The mean unweighted percentage control was Baycor, 75%; Plantvax x 1, 20%; and Plantvax x 2, 51%.

Baycor gave better control of fuchsia rust when assessed by extent of defoliation, number of flowers, or area of pot covered (Table 2).

Table 1. Effect of fungicide sprays on severity of rust infection of fuchsia 'Bonanza' as measured by visual rating.

	Treatment				
Date of Spraying	Date of Observation	Untreated	Baycor	Plantvax x 1	Plantvax x 2
Dec. 29	Jan. 8	3.4	3.4	3.4	3.4
Jan. 8	Jan. 25	2.8	0.7	1.6	2.1
Jan. 25	Feb. 4	3.0	1.6	3.0	1.3
Feb. 4	Feb. 14	3.0	0.6	2.7	1.3
Feb. 22	2.7	0.2	1.9	0.9	

Table 2. Effect of fungicide sprays expressed as percent of controls on severity of rust infection of fuchsia 'Bonanza'.

Treatment	Defoliation	Number of Flowers	Area of Pot Covered
Untreated	100	0	0
Baycor	4	68	70
Plantvax x 1	69	23	15
Plantvax x 2	17	58	45

DISCUSSION

The results given above show that irrespective of the method of assessment, outbreaks of fuchsia rust can be safely and significantly reduced by treatments at 10 day intervals with Baycor fungicide.

CITRUS NURSERY PRACTICES IN HUNAN PROVINCE, PEOPLES REPUBLIC OF CHINA

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My observations are limited to the Central Southern Province of Hunan, latitude approximately 26°N. Citrus is also grown in a number of neighbouring provinces having a similar climate.

Historical records indicate citrus culture began in China about 4,000 years ago and was widespread by the Qin and Han periods, (221 BC to 220 AD). Changsha, the capital of Hunan Province, is the site of an archaeological find of great importance to the citrus world. Seeds of a citrus species were unearthed in a 2,100 year old tomb.

Citrus research was accelerated after the establishment of the Peoples Republic of China in 1949. However the cultural revolution of the 1970's was responsible for the destruction of vast areas of citrus orchards as citrus was then regarded as a revisionist fruit.

The census figures of 1980 show that China had 180,000 hectares of citrus planted of which 67,000 hectares was bearing. Production reached 797,000 tonnes in 1981. The production per hectare figure of less than 12 tonnes is extremely low by Australian standards.