MODERATOR HAUSCH: Our next speaker this evening on rose rootstocks will be Dr. Robert Ticknor. His topic will be, Nursery Performance of Selected Garden Rose Rootstocks.

DR. ROBERT TICKNOR: Thank you. After this strong case for *Rosa canina,* I am not so sure that in coming up here with *Rosa multiflora* that we have the right product. However, I think the difficulty in propagation of *R. canina* has been one of the main reasons that *Rosa multiflora* has been the leading rootstock in the U.S. From some of the reports I have heard from England they are using more *Rosa mulitflora* there also. Again, this is because of propagation problems and the fact that it produces slightly larger plants faster from the nursery view-point.

NURSERY PERFORMANCE OF SELECTED GARDEN ROSE ROOTSTOCKS

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Studies of rootstocks for hybrid tea roses were started at Oregon State University in 1948 and are still being carried out. The present report deals with a trial started in December, 1960, and completed in November, 1962.

In Oregon, California, and the Southwest rose growing areas, cuttings are used for rootstocks, while in the Northeast, seedlings of *Rosa multiflora* are used. In the past, mixtures of different *R. multiflora* types were used as rootstocks for hybrid tea roses in Oregon. At present, most rose growers in Oregon, as well as in Texas, are using clonal lines of *R. multiflora,* while in Arizona and southern California the variety, Dr. Huey is used. Growers in all of these areas have made rootstock selections. In addition to grower-selected lines, Dr. G. J. Buck at Iowa State University, Ames, has a breeding program to develop better rose rootstocks.

Cuttings of two California, one Iowa, nine Oregon, and four Texas rootstocks were used in this trial, which was started in December, 1960. Nine-inch cuttings, which had been disbudded so that only the top two buds remained on each cutting, were inserted so only the top inch of the cutting was exposed. Rooting took place in hilled-up rows in the field during the winter and early months of spring.

Telone, at 28 gallons per acre, was used in September, 1960, to free the field of nematodes prior to hilling up the rows. Simazin, at one pound per acre, was applied to these rows in November, 1960, to prevent the development of winter annual weeds. Additional applications of Simazin, at two pounds per acre, were made in May, 1961, October, 1961, and April, 1962.

Five hundred cuttings of each understock variety were ran-

domized in blocks of twenty-five cuttings throughout the field. Each stock-scion combination was replicated four times. Five scion varieties were budded on the rootstocks in August, 1961: Etoile de Holland, red; Lowell Thomas, yellow; Picture, pink; President Hoover. bicolor; and White Prince, white. Border rows were also budded with the scion varieties.

The buds were covered with soil on September 30, 1961, for frost protection. The rootstock was cut off above the buds on March 8, 1962, and the soil was removed from around the buds on March 30, 1962. Pinching the scion shoot to induce branching, and removing rootstock suckers was done several times during the growing season. Digging and grading, to A.A.N. standards, was accomplished between October 30 and November 2.

Results and Discussion

Results of this experiment presented in Tables 1 and 2 show the cutting stand and the percentage of plants produced in the saleable #1 and #1½ grades. The majority of the rootstocks rooted well, with the exception of #1, #8, #5214, #5360, and Dr. Huey. On a comparative basis, certain rootstock varieties

Table 1 Number of cuttings rooted (out of 100 planted) and bud-take for sixteen understocks and for five scion varieties of roses Cuttings for each understock-scion combination stand evaluated August 28, 1961 Roses budded August, 1961; stand evaluated June 20, 1962

Rootstock	SCION VARIETY									
	Lowell Thomas		Pres Hoover		White Prince		Picture		Etoile de Holland	
	Cutting Stand	Bud Stand	Cutting Stand	Bud Stand	Cutting Stand	Bud Stand	Cutting Stand	Bud Stand	Cutting Stand	Bud Stand
Oregon										
1	79	36	86	66	74	24	86	53	85	27
6	94	53	82	61	95	28	93	41	86	38
8	93	41	90	44	87	33	80	29	81	30
Vandermoss	96	73	98	67	91	39	93	55	99	35
5214 P&D	83	45	61	33	72	33	80	55	75	39
5222 P&D	92	61	94	69	95	62	91	70	96	53
5234 P&D	94	69	93	63	95	58	94	67	92	58
5350 P&D	92	61	86	61	84	36	90	55	89	33
5360 P&D	84	48	65	41	72	25	75	42	78	46
Iowa										
D-1	84	66	89	58	94	60	90	64	94	45
Texas										
Ginn 58-L-2	98	61	91	73	100	48	93	47	91	39
Burr	97	54	99	67	81	32	100	46	94	41
Clark	98	39	96	63	98	21	94	39	96	34
Brooks-48	95	54	98	35	96	30	96	52	95	8
California										
Dr. Huey	78	38	86	55	78	35	78	35	87	17
Ragged Robin	99	47	94	37	100	41	98	40	92	34
Average	91	53	88	56	88	38	89	49	90	36

—Ginn, D-1, 5222, 5234, and Van—proved to be outstanding for bud stand with the five scion varieties used in this trial.

Significant differences in the production of #1 and #1½ plants, caused by both scion variety and by rootstock, were observed. Results with the variety 'Picture' were close to the mean of the experiment, while those with 'President Hoover' and 'Lowell Thomas" were significantly better, and 'Etoile de Holland' and 'White Prince' were poorer. Four of the 16 rootstocks gave superior performance when all five scion varieties were considered, but a total of eight rootstocks were superior for a particular stock-scion combination.

Results obtained in this experiment were below usual commercial stands, but were not too different from those of many growers during these particular crop years. Late August budding, with temperatures up to 107° F., undoubtedly resulted in a lower bud-take.

Summary

Four superior rootstocks for nursery performance with the five scion varieties were determined. Four other rootstocks gave superior performance with one or more scion varieties.

Table 2 Production of No. 1 and No 1½ rose plants, expressed as mean percentage; based on 25 cuttings

	SCION VARIETY					
Rootstock	President Hoover	Lowell Thomas	White Prince	Picture	Etoile de Holland	Mean of All Varieties
Oregon						
1	52 9*	36 9	21 0	39.0	13 0	32 6
6	46.0	38 0	23 0	26 0	28 0	32 1
8	35.0	16.0	11.0	13 0	10 0	18 4
Vandermoss	52.0	56 0**	29.0	36 0	22 0	39 2
5214 P&D	22 0	31 0	23 0	35 0	13 0	24.8
5222 P&D	52 0	41 0	47 0**	50 0**	24.0	43.6*
5234 P&D	50 0	53 0**	48 0**	49.0**	25.0	45.0**
5350 P&D	51.0	48 0	31 0	46 0**	21 0	39.4
5360 P&D	26 0	34.0	16 0	28 0	29 0	26 6
Iowa						
D-1	50 0	57.0**	43 0**	42 0	30 0*	44 4*
Texas						
Ginn 58-L-2	62.0**	60 0**	38.0*	27 0	27 0	42.8*
Burr	56 0**	45 0	17 5	36.0	32.0**	37 5
Brooks - 48	27 0	44.0	25 0	28 0	5.0	27 4
California						
Huey	46 0	34 0	34 0	28 0	13.0	31.0
Ragged Robin	36 0	33 0	21 0	24.0	19 0	26 6
Variety Mean	44 7	41.2	28 2	33 2	21 3	
Gross Mean						33 7
	Rootstock	8 10	10 69			
	Variety	5 37	7 52			
	L. S. D.	*p= 0.05	**p= 0 01			

MODERATOR HAUSCH: Next on our rose program we will have Mr. Ralph S. Moore who is well known for his growing of miniature roses. His subject will be, Mist Propagation of Miniature Roses. Mr. Moore!

MIST PROPAGATION OF MINIATURE ROSES

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I have been interested in mist propagation of cuttings for at least fifteen years. An article published in the American Nurseryman some eleven or twelve years ago reported experiments with misting over a two-year period and so I decided to experiment on my own. At about this time I found where a mist nozzle could be obtained which looked as if it would work, so I installed about a dozen mist heads.

As little information was available on the use of misting as an aid in rooting cuttings, I had to learn the hard way. For example, such items as amount of water, duration, drainage, rooting medium, hardening off cuttings after rooting, etc. had to be learned by the trial and error method.

I have observed a number of different misting nozzles but for my purpose still prefer the original Thompson #215 (made in Los Angeles by Thompson Sprinkler Co. and available through various dealers). It is relatively inexpensive and trouble-free.

These heads operate on low pressure (our's varies from 40-60 psi at the pump). Each head is adjustable — from full open to completely closed. This is important to us for several reasons. Individual heads may be turned on as the cutting bed is filled or one or more heads can be temporarily turned off to permit working in an area without interfering with misting the rest of the bed.

At time of hardening off, any individual area may be separately controlled by merely closing down the screw adjustment; all varieties do not take the same time to root, or a bed may not be all filled at the same time.

In addition to the above individual nozzle control, each line of seven to fifteen mist heads is separately controlled by an ordinary garden valve. In the past we have used globe valves and pipe unions but now have converted to the garden valve with a short section of rubber garden hose connecting to the mist line.

All of our propagation is outdoors (or in semi-outdoor houses) usually with no cover at all. Our winter temperature sometimes drops to as low as twenty-six degrees and we found that the loss of regular garden valves was nearly zero while we were losing nearly one-half of our globe valves. By using the short (18 inch) section of garden hose which is easily discon-