EFFECT OF TIME OF APPLICATION OF GIBBERELLIN SIZING SPRAYS ON BERRY WEIGHT & MATURITY

Date of application	Berry diameter when sprayed	Weight per berry	Degrees balling	Total tartaric acid
	mm	gms		gms per 100 ml
May 27	4–5	4.64 a*	16.0 a	.82 a
June 3	7–8	4.58 a	16.0 a	.87 a
June 10	9–10	3.97 b	15.7 a	.88 a
June 17	9–10	4.06 b	16.0 a	.91 a

* Means in column not followed by the same letter are significantly different at the 5% level.

Sample berries were harvested on August 8. Four berries were picked at random from each vine for a total of 600 to 700 berries per row. The weight per berry, degrees of Balling, and total acid content of each sample were determined.

Results

The results (see table), show that the timing of the gibberellin spray had no significant effect on either the maturity of the fruit, as measured by the degree of Balling, or on the total acid content.

The berry size showed differences among treatments. The first two spray treatments produced significantly larger berries than the last two, but the differences between the first two or last two were not significant.

At the time of the first two treatments the berries were in the initial stage of rapid berry growth. At the time of the last two, the berries were apparently in the stage of slowed berry growth, the flattened portion or stage 2 of the double-sigmoid curve typical of the growth of berries. The greatest response to gibberellin was obtained by the two applications made during the first rapid growth stage.

Capstem diameter

Another difference observed, but not confirmed by measurement, was the larger diameter of the capstem produced by the first two sprays compared with the last two treatments. After harvest, larger capstems lose moisture more slowly than do smaller capstems and so retain their attractive green color longer.

The vineyard used in this trial received a 10 ppm gibberellin thinning spray at the 60 per cent bloom stage on May 10; the vines were girdled on May 31. The vines were thinned to 20 to 25 clusters per vine with the clusters cut leaving the upper five to seven laterals. These and other cultural practices were those normally employed by the producer.

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RH 315

a new herbicide with potential for weed control in lettuce

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RH 315 is a new experimental herbicide with considerable promise for use in California agriculture. It is not registered for use. This is a progress report of cooperative research on a new product.

SELECTIVE WEED CONTROL in lettuce is essential to the future of mechanized production. Several herbicides will selectively control most summer weed species in lettuce with a margin of safety. Benefin (Balan), an excellent grass killer, also controls several of the important broadleaf weed species. However, it has little effect on hairy nightshade, shepherdspurse, groundsel and related weed species. Bensulide (Prefar), very safe for use in lettuce and an excellent grass killer, is not very effective on many broadleaf weeds including those mentioned above. Neither herbicide is effective on volunteer barley. While IPC is excellent for the control of volunteer barley, it is not very effective on most broadleaf weeds. The combination of benefin and IPC has given excellent weed control in a number of trials, but is somewhat weak on groundsel, sowthistle and shepherdspurse.

A new herbicide, known only as RH 315 (developed by Rohm & Haas Co.) shows considerable promise for the control of annual grasses and many broadleaf weed species found in lettuce. Like all selective herbicides, it is weak on some weeds which are related to the crop species. However, RH 315 controls volunteer barley and many other grass species, and is quite effective on several broadleaf weed species not presently controlled by other lettuce herbicides.

RH 315 caused less injury to lettuce than benefin when used at herbicidal rates. Rates up to 2 lbs per acre of RH 315 caused almost no injury except in one Imperial Valley trial where there was a slight reduction in lettuce stand. The herbicide was noticeably more toxic at 4 lbs per acre incorporated to 3 inches than at only 1½ inches in a Monterey County trial.

TABLE 1. SUMMARY OF 1967–68 WEED CONTROL TRIALS IN LETTUCE

Herbicide	lb/A	Number of trials*			
		Weed control		Safety§	
		Success†	Failure‡	Success	Failure
Benefin	1	8	9	12	0
Benefin	2	3	1	1	3
IPC	3–4	2	6	3	2
IPC	6	2	5	4	3
RH 315	½	4	9	9	0
RH 315	1	13	6	18	0
RH 315	2	18	3	18	1
RH 315	4	12	0	5	5
Benefin + IPC	1 + 3	7	2	6	0
Benefin + RH 315	1 + 1	7	1	8	0

* Number of trials conducted in California: Monterey County—12, Imperial County—1, Ventura County—3, Fresno County—1, Santa Barbara County—1, UC, Riverside—4, and UC, Davis—1.

† Number of trials showing satisfactory weed control (out of 23 total trials).

‡ Failures due to resistant weed species or insufficient incorporation. The trials included pre-plant incorporated, post-plant, pre-emerge furrow and sprinkler irrigation.

§ Number of trials showing safety or loss of stand, early stunting, or symptoms.

TABLE 2. PERCENTAGE OF WEED CONTROL BY SPECIES*

Herbicide	lb/A	Ground-sel	Sow This-tle	Hairy Night-shade	Pig-weed	Shep-herds-purse	Lambs-quar-ter	Goose-foot	Knot-weed*	Malva	Burn-ing-Nettle	Purs-lane	Thyme-leaf speed-well	Misc.	Grass	Average‡
Benefin	1	5.3	20.0	0	77.5	11.6	58.8	73.8	50.0	50.0	36.0	72.7	77.0	37.0	95.0	51.1
Benefin	2	7.1				5.3					16.5	72.6			100.0	40.3
IPC	6	0†	0†	50.0		90.0†	56.0†	41.0†	100.0	18.0†		79.0		43.0	100.0	64.1
RH 315	½	16.8	3.3	100.0	16.5	74.1	95.0†	30.3	100.0	49.0	76.2	98.0	24.5	81.0	85.0	60.7
RH 315	1	30.8	22.0	100.0	46.5	89.8	89.6	49.8	100.0	42.0	87.2	99.7	34.0	62.0	82.0	66.8
RH 315	2	0	28.6	100.0	72.0	98.2	92.3	67.6	100.0	89.8	93.2	97.4	90.5	75.0	92.0	84.3
RH 315	4		50.0				100.0	65.8		100.0	90.0				98.0	83.9
Benefin + IPC	1 + 3 (or 4)	0†	43.3		76.0		84.2	76.5		63.2	95.5	100.0*	80.5		100.0	77.4
Benefin + RH 315	1 + 1	0†	23.3	100.0	89.5	100.0†	97.0†	88.6	100.00	73.0	76.5	100.0*	90.0	50.0	–	82.3

* 0 = no control, 100 = maximum control; summary of all trials.
† Averaged from one trial only.
‡ Average of all species in all trials to date.

Pre-emergence

Pre-emergence surface applications of RH 315 under sprinkler irrigation and preplant incorporated RH 315 with furrow irrigation were slightly less safe to crops, but they were more effective in controlling weeds. Both methods of application appear feasible. Pre-emergence applications with furrow irrigation were generally not acceptable for weed control—possibly because of the chemical's low solubility (15 ppm). Since the vapor pressure is quite low, the time before application and incorporation may not be critical. No loss in activity was noted up to 72 hours. Under furrow irrigation it appeared that RH 315 should be incorporated.

Few weaknesses

RH 315's few weaknesses are shown in table 2. It is not very effective on groundsel and sowthistle, and is of intermediate effectiveness on pigweed and lambsquarter. It is very effective on hairy nightshade, shepherdspurse, knotweed, lambsquarter, malva, burning nettle, thyme leaf speedwell, purslane, and many grasses including ryegrass, barnyardgrass and volunteer barley. Because RH 315 is weak on species related to lettuce, it may be weak on this entire group of plants—suggesting a true physiological selectivity. With this type of selectivity, RH 315 would have wide adaptability under varied environmental conditions. Combinations of RH 315 with other herbicides may broaden its weed control spectrum.

Even at 4-lb-per-acre rates, RH 315 caused only a small reduction of lettuce stand and slight stunting with yellowing. These symptoms were fairly consistent, showing up in over half the trials where the 4 lb/A rate was included. However, RH 315 appeared to have a shorter residual life in the soil than either benefin or bensulide so that succeeding crops may not be affected by the use of RH 315 in lettuce (table 3).

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TABLE 3. RESIDUAL CHARACTERISTICS OF THREE HERBICIDES 2½ MONTHS AFTER APPLICATION IN SOIL AT MORENO TRIAL, RIVERSIDE COUNTY*

Herbicide	Rate	After Pre-plant incorporated furrow irrigation			After Pre-emergence sprinkler irrigation		
	Crops:†	1	2	3	1	2	3
	lb/A	Rating‡			Rating‡		
Benefin	1	0.8	0.5	1.5	0§	0§	0§
Benefin	4	2.2	3.5	4.2	0§	0§	0§
Bensulide	8	4.5	6.0	4.0	0	0	0
Bensulide	16	7.5	8.5	6.5	4.2	4.8	2.5
RH315	1	0	0	0	0	0	0
RH315	2	0	0	0	0	0	0
RH315	4	0	0	0	0	0	0

* Soil: Intermediate between Romona sandy loam and Ramona sandy clay. Sand = 69%, silt = 23%, clay = 8%, O.M. = 0.76%, pH = 7.1, cation exchange capacity 6.9 me/100g, EC = 1.2mmhos.
† Indicator crops: 1 = sorghum, 2 = Japanese millet, and 3 = prostrate pigweed.
‡ Average of 4 replications 0–10 rating where 0 = no effect, 10 = all dead.
§ Extrapolated from other trials.

New herbicide RH 315 (rows to left) shows good control of weeds in lettuce, as compared with untreated rows to right.