A PERFORMANCE SUMMARY OF FINISH™ BRAND HARVEST-AID ON STRIPPER COTTON

M. Christian, A. Wiese, K. Holmes and G. Henniger
Rhone-Poulenc Ag Company
Cotton Center, Plano, San Antonio and Lubbock, TX

Abstract

Finish® is a new cotton harvest-aid product being developed by Rhone-Poulenc Ag Company for boll opening, defoliation and regrowth control. Finish, has been extensively evaluated across the cotton belt in replicated small plot research trials since 1992 and in Experimental Use Permit (EUP) trials in 1995 and 1996. Defoliation and boll opening results are presented from harvest-aid trials conducted in OK and TX, with comparisons between the 2 trial designs being made when available. Finish performance was comparable to the standards in respect to defoliation. Boll opening was equivalent to or slightly better than the standards. Treatment performance comparisons, when available, between small plot and EUP trial data were usually similar. Finish enhanced defoliation over PREP™ in small plot trials with boll opening responses being equivalent between treatments in the TX trials and increased in the OK trials. Defoliation with Finish was slightly less than Prep + Folex®, with differences being minimized in EUP trials over small plot trials. Boll opening levels were similar between the 2 treatments in small plot trial data, with a consistent trend for enhanced boll opening for Finish being observed in the EUP trial data across evaluation intervals. Initially, Finish provided quicker defoliation at 4-7 DAT when compared to Ginstar. By 10-15 DAT, Ginstar had a higher defoliation mean than Finish with both treatments providing a high level of defoliation. Finish also, had consistently higher boll opening values (6-10%) than Ginstar across evaluation dates. Defoliation results were comparable between tankmixes of Finish + Folex vs. Prep + Folex, although there was a slight trend for reduced defoliation (2%) with Finish + Folex as compared to Prep + Folex in the EUP trial data. Comparing small plot trials with EUP trials, boll opening was initially lower (5%) in the small plot trials for the Finish + Folex treatment, however the difference was not observed at 10-15 DAT. Under commercial EUP conditions, boll opening responses were comparable between the 2 treatments, Finish + Folex vs. Prep + Folex. Significantly greater defoliation was observed in EUP trials with Finish + Ginstar as compared to the Prep + Ginstar combination. To a lesser degree, a similar trend in boll opening response between the 2 combinations was observed as well.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1365-1368 (1997)
National Cotton Council, Memphis TN

Introduction

Finish® is a new cotton harvest-aid product being developed by Rhone-Poulenc Ag Company for boll opening, defoliation and regrowth control. The chemistry, Fritz (1995) and mode of action, Pedersen, et al. (1996) has been previously reported. The current formulation has been extensively evaluated in replicated small plot research trials since 1992. With the approval of an Experimental Use Permit (EUP) by EPA, large plot testing was also conducted across the cotton belt in 1995 and 1996.

Efficacy data has been reported from picker regions of the cotton belt, Collins (1994), Reynolds, et al. (1995), Fritz (1996), Hayes, et al. (1996), Lege, et al. (1997), Pedersen, et al. (1997) and Stewart, et al. (1997), but little or no efficacy data has been reported from the Southwest (SW), the stripper region of the cotton belt. The purpose of this paper, is to report a summary of efficacy data generated in Texas and Oklahoma from 1992 -1996, making comparison's between replicated small plot and EUP trials when possible.

Materials & Methods

The data reported here is summarized in two parts according to trial design. Part of the data reported was extracted from small plot research trials conducted by university, experiment station, extension service, independent consultants or Rhone-Poulenc personnel from 1992-1995. These trials utilized a randomized complete block design having 3-5 replications/treatment. Applications were timed to maximize boll responses from treatments and were applied with either back pack or mechanical ground sprayer equipment. Water was the carrier in all trials with application volumes ranging from 10-20 gallons/acre (gpa) with most being from 14-18 gpa. Defoliation and boll opening evaluations were made at various intervals after trial initiation.

The other part of the data reported was extracted form EUP research trials conducted by university, experiment station, extension service, independent consultants or Rhone-Poulenc personnel from 1995-1996. These trials typically involved non-replicated large plots, but some incorporated replicated strip plots. Trial initiation was based upon normal harvest-aid practices for boll opening. Treatments were applied with standard commercial ground or aerial application equipment. Water was the carrier in all trials with application volumes ranging from 8-15 gpa by ground and 3-5 gpa by air. Defoliation and boll opening evaluations were made at various intervals after trial initiation. At each evaluation date, non-replicated large plots were subsampled 4-6 times/treatment.

Defoliation and boll opening data is reported separately for small plot and EUP trials. Only trials where direct treatment comparison could be made were included in either

summary. Specific treatments comparisons were: Finish vs. PREP™ , Finish vs. PREP + Folex®, Finish + Folex vs. Prep + Folex, Finish vs. Ginstar and Finish + Ginstar vs. Prep + Ginstar. Finish at 1 qt/a (1.0 lb ai/a ethephon equivalent) and Prep at 1.0 lb ai/a were constant whether evaluated alone or tankmixed. The Folex rate varied from 8-12 ozs/ when tankmixed with Finish and 10-16 ozs/a when tankmixed with Prep. Ginstar was evaluated at 8 ozs/a alone and at 4-6 ozs/a when mixed with Finish and 6 ozs/a when mixed with Prep. The most popular standard in both small plot and EUP trials was Prep + Folex.

The majority of the trials (70-75) were conducted on stripper cultivars developed and commonly grown in the SW. However, some of the trials were conducted on picker cultivars, which can also be stripper harvested. The data generated on picker type cultivars were included in the summary, since it is popular to strip these varieties within certain areas of the SW.

Discussion

Defoliation

Mean percent defoliation data across 17 small plot trials (Table 1) indicated that Finish provided greater defoliation than Prep at 7 and 14 days after treatment (DAT) with both treatments providing defoliation response above the untreated check (UTC). Depending on the evaluation interval, defoliation in the UTC ranged from 27 - 41%. Typically, some natural defoliation is observed in the SW where determinant cultivars are grown or where cool fronts induce senescence. EUP comparative data between the 2 treatments wasn't available, since producers preference was to include a defoliant with Prep in large plot applications.

Defoliation results at 4-7 and 10-15 DAT from small plot and EUP trials comparing Finish and Prep + Folex are shown in Table 2. The average across 29 small plot trials indicated that PREP + Folex was 5-6% better than Finish. In the EUP trials with 9 locations, a similar, but narrower trend (2% difference) was observed. Defoliation levels for both treatments were commercially acceptable in both small plot and EUP trials. Interestingly, defoliation levels were higher in the EUP data than in the small plot data at both evaluation intervals. The differences could possibly reflect a wider range of evaluation conditions occurring over 4 years of testing in the small plot trials as compared to 2 years of EUP trials.

Folex tankmixed with Finish compared to Prep + Folex gave the same mean % defoliation averaged across 12 small plot trials (Table 3). Defoliation was comparable between the 2 treatments in the EUP trials, with a negligible difference of 2% less response for Finish + Folex on both evaluation intervals. However, defoliation levels for both treatments were commercially acceptable. Folex rates used in these trials were slightly less, 8-12 oz/a, when mixed with Finish than when mixed with Prep, 12-16 ozs/a.

Finish was compared to Ginstar in 7 small plot trials from 1992 -1995 in OK and TX (Table 4). Initially, Finish provided quicker defoliation at the 4-7 DAT evaluation interval than Ginstar. However, by 10-15 DAT, Ginstar had on average higher defoliation than Finish. Similar comparisons weren't made in EUP trials, since EUP trials included some type of commercial ethephon treatment for enhanced boll opening.

When a low rate of Ginstar was tankmixed with Finish in the EUP trails, a significant increase in defoliation over Prep + Ginstar was observed at both evaluation intervals (Table 5). A comparison of small plot trial data wasn't available for Prep + Ginstar, but the mean defoliation of Finish + Ginstar was consistent with the EUP data.

Boll Opening

Mean % boll opening data from 14 small plot trials conducted in TX indicated that boll opening levels were the same for Finish vs. Prep (Table 6) regardless of evaluation date. In small plot trials conducted n OK, a 6-7 % increase in boll opening was observed for Finish over Prep across evaluation dates. Boll opening means were similar between Finish and Prep + Folex in small plot trials (Table 7), with a consistent trend for enhanced boll opening for Finish being observed in the EUP trials across evaluation intervals.

When Folex was tank mixed with Finish and Prep, a decrease in mean % boll opening with Finish + Folex was observed at 4-7 DAT in small plot trial data (Table 8). However, by 10-15 DAT boll opening means were equal between Finish + Folex and Prep + Folex. In the EUP data, boll opening means were comparable between the 2 treatments. If there are any initial negative effects on boll opening from mixing Folex with Finish as suggested by the small plot trial data, they are short lived, dissipating over time. Also, data from the EUP trials utilizing commercial applications would indicate there aren't any significant boll opening differences between the 2 treatments.

A strong trend for increased mean % boll opening with Finish over Ginstar was observed in small plot trial data (Table 9). Finish gave a 6 and 10% increases at 4-7 and 10-15 DAT respectively. These increases aren't surprising, since ethephon treatments are generally expected to provide more boll opening than none ethephon treatments. Similar treatment comparisons between Finish and Ginstar weren't made in EUP trials, because EUP trials included some type of commercial ethephon treatment for enhanced boll opening.

When Ginstar was tankmixed with Finish and Prep, mean % boll opening was greater with Finish + Ginstar than with Prep + Ginstar in the EUP trial data (Table 10). Differences were slight, but the positive trend observed with the Finish + Ginstar combination was consistent across evaluation intervals. In the small plot data, only evaluations on Finish

+ Ginstar were available, with mean % boll opening trends being comparable to the EUP trial data.

Summary

In small plot and EUP trials conducted in OK and TX, Finish harvest-aid provided effective and comparable defoliation and equivalent or enhanced boll opening compared to the standards. Treatment performance comparisons, when available, between small plot and EUP trial data were usually similar. Defoliation with Finish was better than PREP in small plot trials. Boll opening responses were equivalent between treatments in the TX trials and increased in the OK trials. Defoliation with Finish was slightly less than with Prep + Folex, with differences being minimized in EUP trials over small plot trials. Boll opening levels were similar between the 2 treatments in small plot trial data, with a consistent trend for enhanced boll opening for Finish observed in the EUP trial data across evaluation intervals. Finish vs. Ginstar comparisons were only available from small plot trail data. Initially, Finish provided quicker defoliation at the 4-7 DAT than Ginstar. By 10-15 DAT, Ginstar had a higher defoliation mean than Finish with both treatments providing a high level of defoliation. Finish also, had consistently higher boll opening means (6-10%) than Ginstar across evaluation dates.

Defoliation results were comparable between tankmixes of Folex with Finish and Prep in the small plot trial data, with the data showing a 2% difference in favor of the Prep + Folex treatment compared to Finish + Folex in the EUP trials. Boll opening with Finish + Folex, initially was lower (5%) in the small plot trial data with, with the response being equal to Prep + Folex by 10-15 DAT. However, under commercial EUP application conditions, boll opening responses were comparable between the 2 treatments. Significantly greater defoliation was observed in EUP trial data with the Finish + Ginstar combination as compared to the Prep + Ginstar combination. To a lesser degree, a similar trend in boll opening response between the 2 combinations was observed as well.

Acknowledgments

Finish® and Folex® are registered trademarks of Rhone Poulenc Ag Company.

PREP™ is a trademark of Rhone Poulenc Ag Company.

Ginstar® is a registered trademark of AgrEvo USA Company.

References

Collins, J.R. and C.D. Fritz. (1995). Beltwide Summary Of EXP31039 For Defoliation, Boll Opening And Regrowth Control In Cotton. Proceedings Beltwide Cotton Conferences, pp. 606.

Fritz, C.D. 1995. Evaluations of EXP31039, A New Harvest-Aid Product. Proceedings 21st Annual Meeting of The Plant Growth Regulator Society of America, pp. 154-158.

Fritz, C.D. 1996. Finish Cotton Harvest-Aid. Proceedings Beltwide Cotton Conferences, pp. 56-58.

Hayes, B., O. Gwathmey, C. Bonner, B. Robertson, E. Vories, G. Stevens and B. Phipps. 1996. Heat Unit Effects on Harvest-Aid Performance of Finish in the North Delta. Proceedings Beltwide Cotton Conferences, p. 1218.

Lege, K.E., M.E. Roof and O.L May. 1997. Evaluation Of Finish Harvest Aid Material In The Southeastern Coastal Plain. Proceedings Beltwide Cotton Conferences, (in press).

Perdersen, M.K., J.D. Burton and H.D. Coble. 1996. Effect of RPA90946 on Auxin Transport. Proceedings 22nd Annual Meeting of The Plant Growth Regulator Society of America, p 166.

Perdersen, M.K., J.R. Collins, J.D. Burton, H.D. Coble and C.D. Fritz. 1997. Efficacy of Finish™ And It's Mechanism Of Action. Proceedings Beltwide Cotton Conferences, (in press).

Reynolds, D.B., P.R. Vidrine, S.H. Crawford and R.A. Shaw. (1995). Evaluation Of EXP31039B As A Cotton Defoliant. Proceedings Beltwide Cotton Conferences, pp. 1091-1092.

Stewart, A.E., K. Edmisten and R. Wells. 1997. Evaluation Of Various Boll Opening Products For Use In North Carolina. Proceedings Beltwide Cotton Conferences, (in press).

Table 1. Mean* percent defoliation of Finish vs. Prep in small plot trials conducted in OK and TX, 1992-1995.

Treatment	Rate lbs ai/a	4-7 DAT	10-15 DAT
UTC	---	27	41
Finish**	1.125	48	68
Prep	1.0	64	76

* Mean of 17 small plot trials.
** Finish at 1.125 lbs ai/a contains 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 2. Mean* percent defoliation of Finish vs. Prep + Folex in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**	1.125	65	79	82	91
Prep + Folex	1.0 + (12-16ozs/a)	71	84	84	93

* Mean of 29 small plot trials, 1992-1995 and 9 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 3. Mean* percent defoliation of Finish + Folex vs. Prep + Folex in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**+ Folex	1.125 (8-12ozs/a)	65	79	82	91
Prep + Folex	1.0 + (12-16ozs/a)	71	84	84	93

* Mean of 12 small plot trials, 1992-1995 and 9 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 4. Mean* percent defoliation of Finish vs. Ginstar in small plot trials conducted in OK and TX, 1992-1995.

Treatment	Rate lbs ai/a	4-7 DAT	10-15 DAT
Finish**	1.125	66	83
Ginstar	1.0	59	90

* Mean of 7 small plot trials.
** Finish at 1.125 lbs ai/a contains 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 5. Mean* percent defoliation of Finish + Ginstar vs. Prep + Ginstar in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**+ Ginstar	1.125 (4-6 ozs/a)	76	89	78	90
Prep + Ginstar	1.0 + (6 ozs/a)	--	--	69	78

* Mean of 12 small plot trials, 1992-1995 and 3 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 6. Mean* percent boll opening of Finish vs. Prep in small plot trials conducted in OK and TX, 1992-1995.

Treatment	Rate lbs ai/a	TX 4-7 DAT	TX 10-15 DAT	OK 4-7 DAT	OK 10-15 DAT
UTC	---			35	47
Finish**	1.125	74	88	60	67
Prep	1.0	74	88	53	61

* Mean of 14 and 3 small plot trials in TX and OK, respectively.
** Finish at 1.125 lbs ai/a contains 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 7. Mean* percent boll opening of Finish vs. Prep + Folex in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**	1.125	64	86	74	94
Prep + Folex	1.0 + (12-16ozs/a)	64	85	72	92

* Mean of 29 small plot trials, 1992-1995 and 9 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 8. Mean* percent boll opening of Finish + Folex vs. Prep + Folex in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**+ Folex	1.125 (8-12ozs/a)	54	87	63	93
Prep + Folex	1.0 + (12-16ozs/a)	59	87	64	92

* Mean of 12 small plot trials, 1992-1995 and 9 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 9. Mean* percent boll opening of Finish vs. Ginstar in small plot trials conducted in OK and TX, 1992-1995.

Treatment	Rate lbs ai/a	4-7 DAT	10-15 DAT
UTC	---	47	70
Finish**	1.125	63	87
Ginstar	1.0	57	77

* Mean of 7 small plot trials.
** Finish at 1.125 lbs ai/a contains 1.0 lb ai/a ethephon.
DAT = Days after treatment.

Table 10. Mean* percent boll opening of Finish + Ginstar vs. Prep + Ginstar in small plot and EUP trials conducted in OK and TX, 1992-1996.

Treatment	Rate lbs ai/a	Small Plot 4-7 DAT	Small Plot 10-15 DAT	EUP 4-7 DAT	EUP 10-15 DAT
Finish**+ Ginstar	1.125 (4-6 ozs/a)	67	87	83	92
Prep + Ginstar	1.0 + (6 ozs/a)	--	--	82	90

* Mean of 12 small plot trials, 1992-1995 and 3 EUP trials, 1995-1996.
**Finish at 1.125 lbs ai/a has 1.0 lb ai/a ethephon.
DAT = Days after treatment.