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2019 FFA Agronomy Team Event Answer Sheet

Please answer the following questions, indicate your choice where appropriate, or complete the calculations.
Type your answers in the blue highlighted boxe

Question 1. Summarize in three or more bullet points what your FFA Chaper consulting team has been hired to do by Wayne Trace Farms?

- Determine whether contracting to grow Plenish soybeans will be more profitable than growing a non-Plenish soybean cultivar.
- Determine if it will be more economical to apply fertilizer using variable rates for the three zones or whether a single rate as determine by the composite soil test sample will be more economical.
- Determine which preemergence herbicide or herbicides should be included with the burndown program.
- Calculate the breakeven yield and portential for profit or loss.
- Choose a soybean cultivar with frogeye leaf spot resistance.
- Calculate the cost of planting the soybean crop and the expenses associated with the crop.

Question 2. Give a concise statement of what problem or problems Wayne Trace Farms faces?

The farm must decide whether to contract to grow Plenish soybeans and if the lower yield and added expenses will allow profitability under the contract.

Question 3. What option did you advise Wayne Trace Farms to choose with respect to the following:

Cultivar Selection: **Choose one Plenish cultivar and one non-Plenish cultivar**

Plenish Cultivar	**Non-Plenish Cultivar**
P28A74PR	P33A24X

Delete this line in the final anwwer sheet

Best answers are Pioneer brand P28A74PR as the Plenish soybean cultivar and Pioneer brand P33A24X as the non-Plenish cultivar.

Why did you choose these two cultivars?

Either of these cultivars had the best or close to the best rating for frogeye disease resistance as well as some Phytophora field resistance.

Fertlizer Application Method: Which would you choose variable rate by zone or one rate across all zones.

Answer: Variable rate across zones for Plenish or non-Plenish

How many bags of seed will be used to plant the zones using variable rate technology? 33

Which preemergence herbicide or herbicides was the best choice? 4.5 oz/acre of Fierce XLT is the best answer.

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Seed Costs:

Assumptions to use: Seed will cost $65.00/bag
A bag of seed contains 140,000 seeds.
Zone 1 is 10.36 acres in size and will be seeded at 140,000 seed per acre
Zone 2 is 4.09 acres in size and will be seeded at 180,000 seed per acre
Zone 3 is 15.12 acres in size and will be seeded at 160,000 seed/acre

Calculations:	**Acres x**	**Seed/acre**	equals # seed/zone	divided by seed per bag		Bags
Zone 1	10.36	140,000	1,450,400	140,000	equals	10.36
Zone 2	4.09	180,000	736,200	140,000	equals	5.26
Zone 3	15.12	160,000	2,419,200	140,000	equals	17.28
Totals	29.57		4,605,800	140,000	equals	32.90

Since you can't buy just a fraction of a bag, Wayne Trace Farms will need to buy how many bags and this will cost how much money if each bag costs $65.00?

Number of bags needed:	33
Cost of seed:	$2,145.00

Planting Costs:

Assumptions: Field has 29.57 acres
Field will be planted no-till with a split row planter on 15 inch rows

No. Acres	Cost per acre for No-till Planting	Total Cost
29.57	$19.25	$569.22

Fertilizer Costs:

Phosphorus Fertilizer

Any Plenish Cultivar

Option 1: Apply the soil test recommended fertilizer using variable rates based on the Zones.

Acres		Soil Test P	Yield Level	Recommended lbs P_2O_5/ac	lbs MAP/ac	Total needed in tons/zone	Cost
10.36	Zone 1	22 ppm	78.1 bu/ac	60	115.38	0.60 tons	$321.60
4.09	Zone 2	46 ppm	33.5 bu/ac	0	0	0 tons	$0.00
15.12	Zone 3	30ppm	46.1 bu/ac	40	76.92	0.58 tons	$310.88
Total:							$632.48

Option 2: Apply the recommended fertilizer over the entire field using the composite soil test data.

Acres	Composite	Soil Test P	Yield Level	lbs P_2O_5/ac	lbs MAP/ac	Tons MAP needed	Field Cost
29.57	sample	29 ppm	55.6 bu/ac	50	96.15	1.42 tons	$761.12

Question 4. For a Plenish cultivar, would it be more economical to use variable rate fertilization or go with a composite rate across all Zones?

Answer: The least expensive option for a Plenish cultivar is to use variable rate fertilization. This will save $128.64 for the field versus a singe rate.

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Fertilizer Costs Continued:

Phosphorus Fertilizer

Any Non-Plenish Cultivar

Option 1: Apply the soil test recommended fertilizer using variable rates based on the Zones.

	Acres		Soil Test P	Yield Level	Recommended lbs P_2O_5/ac	lbs MAP/ac	Total needed in tons/zone	Cost
	10.36	Zone 1	22 ppm	82.2 bu/ac	65	125	0.65 tons	$348.40
	4.09	Zone 2	46 ppm	35.3 bu/ac	0	0	0 tons	$0.00
	15.12	Zone 3	30ppm	48.5 bu/ac	40	76.92	0.58 tons	$310.88
Total:								$659.28

Option 2: Apply the recommended fertilizer over the entire field using the composite soil test data.

	Acres	Composite	Soil Test P	Yield Level	Recommended lbs P_2O_5/ac	lbs MAP/ac	Tons MAP needed	Field Cost
Total:	29.57	sample	29 ppm	58.5 bu/ac	50	96.15	1.42 tons	$761.12

Question 5. For a non-Plenish cultivar, would it be more economical to use variable rate fertilization or go with a composite rate across all Zones?

Answer: The least expensive option for a non-Plenish cultivar is to use variable rate fertilization. This will be $101.84 less expensive than a singe rate.

Potassium Fertlizer

Any Plenish Cultivar

Option 1: Apply the soil test recommended fertilizer using variable rates based on the Zones.

Zone	Acres	CEC meq/100 g	Soil Test ppm K	Yield Level	Recommended K_2O/ac	lb 0-0-60/ac	Tons 0-0-60 needed	Cost
Zone 1	10.36	9.6	125	78.1 bu/ac	135	225	1.17	$445.77
Zone 2	4.09	15.7	185	33.5 bu/ac	0	0	0	$0.00
Zone 3	15.12	20.1	130	46.1 bu/ac	90	150	1.13	$430.53
Total								$876.30

Option 2: Apply the recommended fertilizer over the entire field using the composite soil test data.

	Acres	CEC meq/100 g	Soil Test ppm K	Yield Level	Recommended K_2O/ac	lb 0-0-60/ac	Tons 0-0-60 needed	Cost
Composite	29.57	19.1	137	55.6 bu/ac	105	175	2.59	$986.79

Question 6. For a Plenish cultivar, would it be more economical to use variable rate fertilization or go with a composite rate across all Zones for K fertilizer?

Answer: The least expensive option for a Plenish cultivar for K fertilization is to use variable rates of K based on the Zones. This will be $110.49 less expensive than a singe rate.

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Potassium Fertizer Continued

Any Non-Plenish Cultivar

Option 1: Apply the soil test recommended fertilizer using variable rates based on the Zones.

Zone	Acres	CEC meq/100 g	Soil Test ppm K	Yield Level	Recommended K_2O/ac	lb 0-0-60/ac	Tons 0-0-60 needed	Cost
Zone 1	10.36	9.6	125	82.2 bu/ac	150	250	1.3	$495.30
Zone 2	4.09	15.7	185	35.3 bu/ac	0	0	0	$0.00
Zone 3	15.12	20.1	130	48.5 bu/ac	90	150	1.13	$430.53
Total								$925.83

Option 2: Apply the recommended fertilizer over the entire field using the composite soil test data.

	Acres	CEC meq/100 g	Soil Test ppm K	Yield Level	Recommended K_2O/ac	lb 0-0-60/ac	Tons 0-0-60 needed	Cost
Composite	29.57	19.1	137	58.5 bu/ac	105	175	2.59	$986.79

The cost to spread the P and K fertilizer is equal to 29.57 acres times $7.25/acre or $214.38

Question 7. For a Plenish cultivar, would it be more economical to use variable rate fertilization or go with a composite rate across all Zones for K fertilizer?

Answer: The least expensive option for K fertilization of a non-Plenish cultivar is to apply variable rates of K based on Zones. This will save the farmer $60.96.

Question 8. Determine the choice of preemergence herbicide to include with the burndown program and calculate the cost of the burndown + preemerge program.

Note: The burndown + preemerge combination will be sprayed at 15 gallons of spray per acre.

Burndown Program:

Product	Rate/acre	Field size acres	Cost/unit	Total cost
Buccaneer Plus	32 fl. oz.	29.57	$0.09/oz	$85.16
Weedone 2,4-D LV4	12 fl. oz.	29.57	$0.15/oz	$53.23
Dicamba HD	8 fl. oz.	29.57	$0.36/oz	$85.16
Spray grade Ammonium sulfate	8.5 lb/100 gal spray	15gal/ac x 29.57 ac	$0.25/lb	$9.44
Burndown Product Cost				$232.99
Preemgence Product Cost from below				$573.51
				Total $806.50

Preemergenc herbicide choices are one or more of the following: 8 oz/ac of Trivence, 4.5 oz/ac of Fierce XLT, and 1.3 pt/acre of Metolachlor (Me-Too-Lachlor)

To make your choice just fill out the rate, acres, cost/unit, and total cost columns for the herbicide or combination of herbicides that you think are the most correct choice for the

	Product choices and combinations--Choose only ONE	Rate/acre	Field size Acres	Cost/unit	Total cost	
	8 oz/ac Trivence	8 oz	29.57	$2.15	$508.60	**Only one line should be filled in; it's bolded**
Correct one	**4.5 oz/ac Fierce XLT**	**4.5 oz.**	**29.57**	**$4.31/oz**	**$573.51**	
	8 oz/ac Trivence plus 1.3 pt/ac Me-Too-Lachlor	8 oz + 1.3 pt	29.57	$2.15 + $3.63/pt	$648.14	
	Total cost of your choice for preemergence:				$573.51	

Question 9. In the highlighted box below, please explain any restrictions or requirements that the use of the burndown combination will entail. What is the target weed in this program?

The primary weed that will be a problem is the glyphosate-resistant marestail in this field. The restrictions that must be observed are a seven day planting restriction for the 12 fl. oz. rate of Weedone 2,4-D LV4 and a 14 day restriction plus the need for 1 inch of irrigation water or 1 inch of rainfall on the field before soybeans can be replanted following the burndown application. To meet these herbicide restrictions, the grower must follow the most restrictive ones--14 days plus one inch of water (rain or irrigation) before planting the soybeans.

R3 Post-emergence Spray Decision and Choices

Assumptions for R3 Spray Treatment:

Application cost is $6.50/acre
Field acreage is 29.57 acres
Spray at 20 gallons of solution per acre
The R3 growth stage is beginning pod
R3 spray application will increase yield by 7 bu/ac
If you do or don't choose to apply the R3 spray, the yields given in the scenario will NOT change so do not make any adjustments to the yield assumptions

Based on the weed, disease, and insect pressure expected (see Scenario) choose which of the following products you should include in the spray solution to be applied at the R3 stage of soybean development.

	Write in space below either Exclude or Include for each choice
Approach Prima at 5 fl oz/acre (Include or Exclude)	Include
Lambda Select at 3 fl oz/acre (Include or Exclude)	Include
Buccaneer Plus at 32 fl oz/acre (Include or Exclude)	Include
Spray Grade Ammonium Sulfate at 8.5 #/100 gallons (Include or Exclude)	Include

Calculate below the TOTAL COST of Product Only for the products you said to include above.

Product	Rate	Acres	Cost/unit	Total Product Cost
Approach Prima	5 fl oz/ac	29.57	$1.58/fl oz	$233.60
Lambda Select	3 fl oz/ac	29.57	$0.65/fl oz	$57.66
Buccaneer Plus	32 fl oz/ac	29.57	$0.09/fl oz	$85.16
S. G.Ammonium Sulfate	8.5 #/100 gal spray	29.57	$0.25/#	$12.57
Application Cost		29.57	$6.50/ac	$192.21
		Total Cost of R3 Spray		$581.20

Note: If you use Amm Sulfate, you'll use 591.4 gallons needing 50.27 lbs of AS

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Question 10. Explain why you included or excluded each product from the R3 spray.

Product	
Approach Prima	This fungicide is applied to help control frogeye leaf spot known to be a problem in this field and can severely reduce yields.
Lambda Select	This insecticide is applied to control the soybean aphids that occur in this area as well as the Mexican bean beetles noted in the scenario.
Buccaneer Plus	Buccaneer Plus is included to help control late-season grasses especially the fall panicum noted in the scenario.
Spray Grade Ammonium Sulfate	Ammonium sulfate is included to improve the effectiveness of the glyphosate product--Buccaneer Plus.

Question 11. How many bushels per acre at $8.98 and/or $9.38/bushel will it take to cover the cost of R3?

At $8.98/bu it will take 2.19 bu/ac and at $9.38 it will take 2.10 bu/ac to cover the cost of the R3 spray.

Profit/Loss and Breakeven Costs

	Acres	$/ac	Total cost		
Cost of combining soybean crop	29.57	$31.50	$931.46		

	Total # of bushels	$/bu/mile	# miles to terminal	Transportation cost
Cost of hauling Plenish soybean	1643.16	$0.005	14.1	$115.84
Cost of hauling non-Plenish soybean	1729.29	$0.005	9.1	$78.68

Income:	Bushels Yield/acre	Acres	Total # of bushels	Price Paid	Income
Plenish cultivar	55.5686	29.57	1643.16	$9.38	$15,412.84
Non-Plenish cultivar	58.4812	29.57	1729.29	$8.98	$15,529.02

	Cost for field	
Production factors:	Plenish Cultivar	Non-Plenish Cultivar
Cost of seed	$2,145.00	$2,145.00
Cost to plant no-till soybeans	$569.22	$569.22
Cost of P fertilizer applied	$632.48	$659.28
Cost of K fertilizer applied	$876.30	$925.83
Cost of spreading dry fertilizer	$214.38	$214.38
Cost of burndown + preemerge	$806.50	$806.50
Cost of R3 Spray program	$581.20	$581.20
Cost to combine the field	$931.46	$931.46
Cost to haul crop to terminal	$115.84	$78.68
Total Production Cost	$6,872.38	$6,911.55
Breakeven for Plenish soybean expressed as bu/ac	24.78 bu/ac	26.03 bu/ac
Net Profit for Plenish cultivar	$8,540.46	
Net Profit for non-Plenish cultivar		$8,617.47

Question 12. Would you advise Wayne Trace Farms to accept the contract to grow Plenish soybeans?

Answer: No, I would suggest that they would reject the contract although the difference in profit is marginal, only $77.01 or $2.60 per acre.