

CHARACTERISTICS OF SPRINKLER PACKAGES

LES JOCHENS
DIRECTOR OF ENGINEERING & INTER-COMPANY DEVELOPMENT
WESTERN IRRIGATION SUPPLY HOUSE, INC.
4640 SOUTH YOSEMITE STREET
ENGLEWOOD, COLORADO 80111

UNDERSTANDING "CHARACTERISTICS" OF A SPRINKLER PACKAGE IS AN IMPORTANT PART OF THE PROCESS OF SELECTING SPRINKLER PACKAGES. IT IS VERY IMPORTANT TO KEEP ALL CHARACTERISTICS IN MIND BECAUSE IT IS INESCAPABLE THAT DURING THE SELECTION, PART OR ALL OF ONE CHARACTERISTIC WILL NEED TO BE TRADED TO OBTAIN PART OR ALL OF ANOTHER CHARACTERISTIC. THE FOLLOWING CHART MAY HELP TO KEEP SOME OF THE CHARACTERISTICS IN MIND. SIX GENERALIZED "OVER THE CROP" SPRINKLER PACKAGES, LEPA AND "DOWN IN THE CROP" PACKAGES ARE SHOWN. ADDING REGULATORS, DROPS, PAD ASSORTMENTS AND MIXTURES OF THESE SYSTEMS, QUICKLY SHOWS THAT ACTUALLY HUNDREDS OF PACKAGES ARE AVAILABLE TO OBTAIN VARIOUS RESULTS UNDER VARIOUS CONDITIONS.

OVER THE CROP SPRINKLING HAS BEEN THE NORM FOR PIVOTS SINCE THEIR BEGINNINGS. IT IS TYPIFIED BY THE ATTEMPT TO MATCH APPLICATION RATE TO SOIL INTAKE RATE. WE HAVE MUCH KNOWLEDGE FOR SELECTING ONE OF THESE PACKAGES FOR A PARTICULAR SET OF CONDITIONS.

A NEWER IDEA WITH ACCELERATING INTEREST IS LOW ENERGY PRECISION APPLICATION (LEPA). DO NOT CONFUSE LEPA WITH "OVER THE CROP" SPRINKLING. IT IS MORE CLOSELY RELATED TO FLOOD IRRIGATION BUT WITH MUCH GREATER PRECISION. SPECIAL DESIGN (CLOSER SPACING) AND SPECIAL MANAGEMENT PRACTICES (MODE CHANGES AND SOIL MANIPULATION) ARE REQUIRED TO OBTAIN MAXIMUM BENEFITS FROM THIS IDEA.

THE NEWEST IDEA WITH GREAT INTEREST GENERATED IN JUST THE LAST TWO YEARS IS "DOWN IN THE CROP" APPLICATION. THIS IDEA HAS EVOLVED BOTH FROM "OVER THE CROP" PEOPLE PUSHING THEIR DEVICES DEEPER INTO THE CROP AND FROM LEPA PEOPLE, WANTING TO MINIMIZE THE LABOR OF MODE CHANGES, USING A SINGLE MODE FOR LONGER TIMES OF THEIR IRRIGATION SEASON.

A COUPLE OF EXAMPLES MAY GET THE THOUGHT PROCESS GOING.

1. A FARMER DECIDES TO USE A MIXTURE OF SPRAY NOZZLES AND ROTATORS. HE WANTS THE FIRST THREE SPANS WITH ROTATORS AND THE REST WITH SPRAYS.

A SECOND FARMER DECIDES TO USE A MIXTURE OF SPRAY NOZZLES AND ROTATORS. HE WANTS THE FIRST THREE SPANS WITH SPRAYS AND THE REST WITH ROTATORS.

THE MIXTURE IS REVERSED ON THESE TWO SYSTEMS. WHICH FARMER IS WRONG? NEITHER.

THE FIRST FARMER HAS SOILS, CROPS, ETC. SO THAT HE COULD

USE SPRAYS ALL THE WAY. HIS PIVOT MACHINE, HOWEVER, HAS OUTLETS TOO FAR APART FOR SPRAYS ON THE FIRST THREE SPANS BUT IT IS OK FOR ROTATORS. HIS MIXTURE WORKS JUST FINE.

THE SECOND FARMER HAS A SOIL AND CROP CONDITION THAT IS NOT FAVORABLE TO THE HIGH AVERAGE APPLICATION RATE OF SPRAYS ON THE OUTER PART OF HIS SYSTEM. HE BEST USES ROTATORS OUT THERE BUT CAN SAVE SOME MONEY WITH LESS EXPENSIVE SPRAYS ON THE FIRST THREE SPANS. HIS MIXTURE WORKS JUST FINE.

2. A FARMER IN THE DESERT SOUTHWEST WENT TO A NUMBER OF MEETINGS, READ MANY ARTICLES AND TALKED TO MANY PEOPLE ABOUT SPRINKLER PACKAGES. HE WAS MOST IMPRESSED WITH THE CONCERN OVER EVAPORATION. HE DETERMINED TO CUT EVAPORATION TO A MINIMUM. HE SELECTED SPRAYS WITH A COARSE PAD AND ON DROPS CLOSE TO THE GROUND. COMPARED TO A LOW ANGLE IMPACT SYSTEM HE PROBABLY CUT HIS EVAPORATION FROM 25% DOWN TO 10% -- A SAVINGS OF 15%. HOWEVER, THIS SELECTION, COMBINED WITH AN OVERLOOKED SLOPE FACTOR AND HEAVY SOIL CONDITIONS, RESULTED IN A 40% RUNOFF -- A NET LOSS OF 15%.

3. DON'T GET ZEROED IN ON ONE FACTOR LIKE EVAPORATION OR ENERGY COST. CONSIDER ALL FACTORS -- SOIL INTAKE RATES -- SOIL SEALING -- CROPS (POTATOES CANNOT BE IRRIGATED LIKE CORN, ALFALFA GERMINATION IS NOT LIKE

CORN GERMINATION) -- HOURS OF OPERATION -- SLOPES --
MACHINE LIMITATIONS (TIME TO MAKE A ROUND, OUTLET
SPACING) AND MANY OTHER FACTORS THAT MAY APPLY TO
YOUR CONDITIONS.

MINIMUM END PRESSURE ON PIVOTS/LATERALS
FOR
TYPICAL WATER DISCHARGE DEVICES

PRESSURE PSI	LEPA	IN THE CROP	OVER THE CROP	
			SPRINKLERS & SPRAYS	END GUNS
80				
75				
70				
65				
60				
55				
50				
45				
40				
35				
30				
25				
20				
15				
10				
5				
0				
	(A)	(B)	(2)	(3)
			(4)	(5)
			(6)	(7)
				(8)
				(9)
				(10)
				(11)
CHARACTERISTICS RATING				
AVERAGE APPLICATION RATE HIGHEST(2) LOWEST(7)				
INSTANTANEOUS APPL RATE LOWEST(2) HIGHEST(7)				
WETTED RADIUS SMALLEST(2) LARGEST(7)				
WATER DROPLET SIZE SMALLEST(2) LARGEST(7)				

- (A) LEPA
- (B) DOWN IN THE CROP
- (2) SPRAY NOZZLES
- (3) ROTATORS & SPINNERS
- (4) SMALL IMPACTS (3/4") MODIFIED NOZZLES
- (5) SMALL IMPACTS (3/4") ROUND HOLE NOZZLES
- (6) LARGE IMPACTS (1") ROUND HOLE NOZZLES
- (7) LARGER IMPACTS (1-1/4") ROUND HOLE NOZZLES
- (8) IMPACT END GUN - MODIFIED NOZZLE OR DIFFUSER ASSEMBLY
- (9) IMPACT END GUN - ROUND HOLE NOZZLE
- (10) GUN TYPE END GUN - DIFFUSER NOZZLE
- (11) GUN TYPE END GUN - ROUND HOLE NOZZLE