



## LEPA Irrigation, When should you use it?

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It was the late 1970s is when the idea behind LEPA irrigation systems for pivots first entered practical research trials for its potential to maximize irrigation inputs by saving energy, increasing irrigation efficiency from pump to root zone, and water use efficiency by the crop.

It was developed for areas like here in West Texas that had center pivot irrigation that had limited access to water and high and increasing energy costs. Dr. Bill Lyle and James Bordovsky should receive the most credit for the developing LEPA at the Lubbock-Halfway Texas Agricultural Experiment Station.

Some people might wonder why a producer would want to water their crop on LEPA stage or even what the difference is.

“LEPA” stands for Low Efficient Pressure Application. LEPA has been tested and proven that 95% to 98% of the irrigation water pumped (at ever increasing costs) gets to the crop’s root zone.

Granted, that is under ideal situations with all equipment working at peak efficiency but even with some give on those numbers it is so much better than the 35% efficiency with gated pipe and the 45% to 60% expected higher pressure pivots of the day that sprayed water through the air and across the soil surface.

In its earliest design, LEPA applied water by hoses that drag along the ground and release water without waste through air exposure and evaporation while making use of a much lower operating pressure.

The hose concept has been revisited and improved upon with various designs over the years with some impressive savings, but when most of us consider a LEPA outfitted pivot we envision the nozzles with changeable settings, with the bubble mode set, resting at the end of a long hose dangling from the pivot about 4 to 18 inches above the surface. The hoses are usually separated about every 60 to 80 inches depending on row spacing so that rows are skip row irrigated.

So, with LEPA type pivot irrigations plants do not get water applied to the plant and soil from above under high pressure with plenty of evaporation opportunities, the water is applied as close to the soil surface as possible, preferably into the bottom of a furrow, which then soaks into the soil and directly to the roots with minimal waste.

It is said that LEPA works best on farms that have sandy or loamy soil because the chances of runoff is not as likely to happen like it would if you had soil that is heavier or tighter. The chances of runoff also increase in no-till systems and on steep slopes.

From this original LEPA idea, several pivot and nozzle / hose types have been developed along the same principle. Most of these more efficient pivots have adjustable nozzles with at least a spray mode and a bubble mode.

With these types of water savings, it can be difficult to understand why we would ever even use a spray mode and go somewhat back to a less efficient method of irrigation.

The truth is, LEPA is great for in-season irrigation efficiency, but terrible for wetting the seed zone and establishing a fledgling crop. Those young plant roots cannot find the moisture from LEPA irrigations and the seeds certainly cannot.

So, a very common question from producers is, "When should I change from spray to bubble mode to best maximize my irrigation efficiency without hurting my young plants and stand establishment?"

There really isn't a set stage for when you should switch over to LEPA. The proper time to switch over to LEPA is the when the plants are grown enough to find the deeper held and better applied water.

Some people will make the mistake of switching to LEPA before the crop is mature enough and the young plants will drought stress and perhaps even die before ever finding that deep moisture so far away from the seed zone. You have to let the plants grow and develop strong roots in the ground so when you switch over to LEPA the roots will be able to reach the water.

Sometimes we need to help them get to the point that they can find that water on their own with spray irrigations and we are very likely to need even irrigations to germinate our often dry planted seeds.

More producers likely make the mistake of staying in spray mode too long and waste some of their precious water by not being as efficient as they could be.

Although that is the safer play and there isn't exactly a set stage for when you should change over to LEPA, if you had to choose a stage to switch over it would be somewhere between match head square and 1/4 grown square stage.

This is about the stage that cotton plants start seriously building lots of fruit sites and vegetative structure. With a similar process going on below ground with the root system, this is generally the first time cotton plants can 'look' for soil moisture themselves.

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