

TORO[®]

Drip irrigation on cotton

Increased yield
with less water



cotton



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Increased yield with less water

Proper crop water relations are essential in optimising cotton growth, development and yield.

Drip irrigation allows scheduling and delivering irrigation water to meet the demand of the crop on a daily basis.

This allows to optimize plant growth while avoiding water stress that could negatively affect the yield.

When compared to traditional methods of cotton irrigation, such as flood or furrow, drip irrigation can enhance water-use efficiency thus proving significant savings for the farm and above all for the environment.

Therefore drip irrigation represents an important production element not only to maximise the yield but also to efficiently manage the farm's resources, such as water, energy, fertilizer and labour thus assuring the profit of the farm.

THE GREAT ADVANTAGES OF DRIP IRRIGATION

The most efficient and effective method of irrigating cotton is definitely drip irrigation whose main advantages are:

Yield

- Increased productivity per hectare cultivated compared to traditional inefficient irrigation methods, furrow or flood (owing to the uniform distribution of water and fertilizer);
- Significant high amount of fibre per unit of water applied; this because the increased productivity is achieved with dramatically reduced application of water (and fertilizer);
- Possibility of increasing the cultivatable surface in areas where the water resource is scarce.

Efficiency and environmental impact

- High irrigation efficiency (all the water is directly supplied to the roots of the plants reducing loss by evaporation to a minimum);
- Significant water saving compared to traditional irrigation methods;
- Extraordinary emission uniformity and consequently crop uniformity;
- Possibility of irrigating with extraordinary uniformity even surfaces with irregular perimeters, rounded corners or in proximity of roads or houses;
- Deficit irrigation practices can save even more water (and hence energy) still assuring same yield;
- Possibility to identify water management strategies that conserve and protect water resources within semiarid environments.

Fertigation

- Accurate and uniform application of fertilizer with a considerable saving (optimisation of the fertilizer dosage in relation to the plant development cycle) and reduced environmental impact;
- Possibility of intervening in case of micro/macro element deficiencies;



System management

- Possibility of irrigating at any time of day without any restriction;
- Ease of irrigation system management and overall farm management;
- Improved ease of field access;

Healthy plants for quality production

- Possibility to exactly schedule irrigations pre and post-bloom thus meeting the cotton water demand throughout its entire development cycle;
- Improved quality of fibre;
- Defence against water stress;
- Reduction of fungal diseases encouraged by water stagnation;
- Efficient delivery of herbicides and pesticides to successfully fight against weeds and insects.

OUR EXPERIENCE, OUR SOLUTIONS

Toro has successfully realised drip irrigation systems for cotton all over the world. After

conducting numerous experimental campaigns Toro offers farmers two innovative solutions for cotton drip irrigation:



Aqua-Traxx PBX: this is the Toro drip tape that assures the best performance on the market, excellent emission uniformity and extraordinary quality;



Neptune: this is the drip line with flat emitter that gives good value for money at the same time guaranteeing high quality and excellent performance.

SUB-SURFACE DRIP IRRIGATION (SDI)

Where possible, a Sub-surface Drip Irrigation system will provide the farmer with these additional advantages:

- A further increase in irrigation efficiency thanks to the reduced loss by evaporation;
- A further increase in yield when adopting oxygation system (air injection into irrigation water allows to deliver oxygen directly to plant's roots);
- Less weed growth and hence an additional great saving in weedkiller;
- Possibility of reusing the system for several seasons (no annual laying and installation costs, and disposal costs only at the end of its operating life);
- Easy crop rotation. In case of diseases, crop rotation is a must. The flexibility of SDI system allows irrigating cotton, alfalfa, corn and many other crops.



It is worth to mention that tillage has no impact on cotton yields. On the contrary switching to reduced or no tillage systems generates greater net returns mainly due to the reduced labour and inputs costs.



Toro offers a wide range of solutions to satisfy the most varied and stringent farming needs and requirements; to name only a few:

should therefore opt for drip irrigation systems with short spacing between the drippers.

In all these conditions, **Aqua-Traxx PBX** is the best choice and is available with:

SANDY LOAM SOIL WITH ROWS OF MEDIUM LENGTH

- 10, 15, 20 and 30 cm spacing;
- 5, 6, 7, 8, 10, 12, 15 mil wall thickness;
- 16 mm (5/8") and 22 mm (7/8") diameters;
- 6 flow rates: 0.30 / 0.38 / 0.42 / 0.57 / 0.64 / 0.87 l/h @ 0.7 bar.

In loose soil the force of gravity predominates with respect to the horizontal water movement and you

SANDY LOAM SOIL WITH ROWS OF MEDIUM LENGTH

Diameter 16 mm (5/8")
Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters					
				@ 0,5 bar	@ 0,6 bar	@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar
RA5xx04100-yyy	0,87 l/h	10 cm	90%	102	103	104	105	105	106
RA5xx0667-yyy	0,87 l/h	15 cm	90%	132	133	135	136	136	137
RA5xx0851-yyy	0,87 l/h	20 cm	90%	159	160	161	163	164	165
RA5xx1234-yyy	0,87 l/h	30 cm	90%	206	208	209	211	212	214
RA5xx0650-yyy	0,64 l/h	15 cm	90%	159	160	162	163	164	165
RA5xx1225-yyy	0,64 l/h	30 cm	90%	246	250	252	254	255	257
RA5xx0467-yyy	0,57 l/h	10 cm	90%	134	135	137	138	139	139
RA5xx0834-yyy	0,57 l/h	20 cm	90%	209	211	213	214	216	217
RA5xx1222-yyy	0,57 l/h	30 cm	90%	270	274	276	278	280	281
RA5xx0825-yyy	0,42 l/h	20 cm	90%	241	242	243	244	245	245
RA5xx0822-yyy	0,38 l/h	20 cm	90%	258	259	260	261	263	263
RA5xx0817-yyy	0,30 l/h	20 cm	90%	304	305	306	308	308	308

Max pressure: 0.7 bar for 5 mil / 0.8 bar for 6 mil / 0.9 bar for 7 mil

Diameter 22 mm (7/8")
Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters					
				@ 0,5 bar	@ 0,6 bar	@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar
RA7xx04100-yyy	0,87 l/h	10 cm	90%	181	183	185	186	187	188
RA7xx0667-yyy	0,87 l/h	15 cm	90%	234	237	239	241	243	244
RA7xx0851-yyy	0,87 l/h	20 cm	90%	282	285	287	289	291	293
RA7xx1234-yyy	0,87 l/h	30 cm	90%	365	368	372	375	378	381
RA7xx0650-yyy	0,64 l/h	15 cm	90%	281	283	286	288	290	292
RA7xx1225-yyy	0,64 l/h	30 cm	90%	436	441	445	448	451	454
RA7xx0467-yyy	0,57 l/h	10 cm	90%	238	241	243	245	246	249
RA7xx0834-yyy	0,57 l/h	20 cm	90%	370	374	379	382	383	387
RA7xx1222-yyy	0,57 l/h	30 cm	90%	478	486	490	494	497	500
RA7xx0825-yyy	0,42 l/h	20 cm	90%	426	428	431	433	434	435
RA7xx0822-yyy	0,38 l/h	20 cm	90%	457	459	461	462	463	465
RA7xx0817-yyy	0,30 l/h	20 cm	90%	536	539	541	543	544	546

Max pressure: 0.7 bar for 7 mil / 0.8 bar for 8 mil

Aqua-Traxx PBX is also available in other models. Ask for more information.





SURFACES WITH VERY LONG ROWS (irrespective of the type of soil)

Where you have long rows and want to reduce the number of irrigation sectors to a minimum simplifying field management without compromising crop uniformity, **Aqua-Traxx PBX** is the right solution. Thanks to the innovative emitters with an ultra-low flow rate (the only ones on the market!), **Aqua-Traxx PBX** can reach considerable lengths guaranteeing an extraordinary emission uniformity:

- 3 ultra-low flow rates:
 - 0.30 l/h @ 0.7 bar - **Already successfully used!**
 - 0.38 l/h @ 0.7 bar - **Already successfully used!**
 - 0.42 l/h @ 0.7 bar - **Already successfully used!**

- 20 and 40 cm spacing;
- 5, 6, 7, 8, 10, 12, 15 mil wall thickness;
- 16 mm (5/8") and 22 mm (7/8") diameters.

With Aqua-Traxx PBX, 22 mm diameter, 0.30 l/h flow rate, 40 cm spacing you can carry the water for more than 800 metres with 90% uniformity!

SURFACES WITH VERY LONG ROWS

Diameter 16 mm (5/8")

Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters					
				@ 0,5 bar	@ 0,6 bar	@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar
RA5xx0825-yyy	0,42 l/h	20 cm	90%	241	242	243	244	245	245
RA5xx1613-yyy	0,42 l/h	40 cm	90%	381	383	385	387	388	389
RA5xx0822-yyy	0,38 l/h	20 cm	90%	258	259	260	261	263	263
RA5xx1611-yyy	0,38 l/h	40 cm	90%	400	401	404	405	406	408
RA5xx0817-yyy	0,30 l/h	20 cm	90%	304	305	306	308	308	308
RA5xx1608-yyy	0,30 l/h	40 cm	90%	470	472	474	476	477	479

Max pressure: 0.7 bar for 5 mil / 0.8 bar for 6 mil / 0.9 bar for 7 mil

Diameter 22 mm (7/8")

Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters					
				@ 0,5 bar	@ 0,6 bar	@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar
RA7xx0825-yyy	0,42 l/h	20 cm	90%	426	428	431	433	434	435
RA7xx1613-yyy	0,42 l/h	40 cm	90%	664	667	670	672	674	676
RA7xx0822-yyy	0,38 l/h	20 cm	90%	457	459	461	462	463	465
RA7xx1611-yyy	0,38 l/h	40 cm	90%	706	713	717	719	721	723
RA7xx0817-yyy	0,30 l/h	20 cm	90%	536	539	541	543	544	546
RA7xx1608-yyy	0,30 l/h	40 cm	90%	833	837	840	843	847	849

Max pressure: 0.7 bar for 7 mil / 0.8 bar for 8 mil

Aqua-Traxx PBX is also available in other models. Ask for more information.



CLAYEY LOAM SOIL WITH ROWS OF MEDIUM LENGTH

Heavy soil is characterised by good horizontal water movement and you should therefore opt for drip lines with longer spacing

between the emitters. **Neptune** is the solution that most efficiently satisfies these requirements

- 40, 50 and 60 cm spacing;
- 8, 10, 12, 15, 18, 20, 24, 30 mil wall thickness;
- 16 mm (5/8") and 22 mm (7/8") diameters;
- 4 flow rates: 0.67 / 1.08 / 1.30 / 1.99 l/h @ 0.7 bar.

CLAYEY LOAM SOIL WITH ROWS OF MEDIUM LENGTH

Diameter 16 mm (5/8")
Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters				
				@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar	@ 1,5 bar*
PTW16xx4020-yy	1,99 l/h	40 cm	90%	116	117	117	117	119
PTW16xx5020-yy	1,99 l/h	50 cm	90%	135	136	136	136	138
PTW16xx6020-yy	1,99 l/h	60 cm	90%	153	153	154	154	156
PTW16xx4014-yy	1,30 l/h	40 cm	90%	146	147	147	148	149
PTW16xx5014-yy	1,30 l/h	50 cm	90%	170	171	171	171	173
PTW16xx6014-yy	1,30 l/h	60 cm	90%	192	193	193	194	195
PTW16xx4011-yy	1,08 l/h	40 cm	90%	171	171	172	172	174
PTW16xx5011-yy	1,08 l/h	50 cm	90%	198	199	200	200	202
PTW16xx6011-yy	1,08 l/h	60 cm	90%	224	224	225	226	228
PTW16xx4006-yy	0,67 l/h	40 cm	90%	251	252	253	253	240
PTW16xx5006-yy	0,67 l/h	50 cm	90%	292	294	294	295	299
PTW16xx6006-yy	0,67 l/h	60 cm	90%	330	331	332	333	335

Max pressure: 0.8 bar for 6 mil

* Max pressure for thickness equal or greater than 18 mil

Diameter 22 mm (7/8")
Slope 0%

Model	Individual Emitter Flow Rate	Emitter Spacing	Emission Uniformity	Maximum Lateral Lengths in meters				
				@ 0,7 bar	@ 0,8 bar	@ 0,9 bar	@ 1,0 bar	@ 1,5 bar*
PTW22xx4020-yy	1,99 l/h	40 cm	90%	203	204	204	205	206
PTW22xx5020-yy	1,99 l/h	50 cm	90%	237	238	238	239	240
PTW22xx6020-yy	1,99 l/h	60 cm	90%	269	269	270	271	273
PTW22xx4014-yy	1,30 l/h	40 cm	90%	256	256	257	258	259
PTW22xx5014-yy	1,30 l/h	50 cm	90%	297	299	300	300	302
PTW22xx6014-yy	1,30 l/h	60 cm	90%	337	338	339	340	342
PTW22xx4011-yy	1,08 l/h	40 cm	90%	299	299	300	300	302
PTW22xx5011-yy	1,08 l/h	50 cm	90%	348	349	350	351	352
PTW22xx6011-yy	1,08 l/h	60 cm	90%	394	395	396	397	399
PTW22xx4006-yy	0,67 l/h	40 cm	90%	441	442	443	444	446
PTW22xx5006-yy	0,67 l/h	50 cm	90%	513	515	516	517	519
PTW22xx6006-yy	0,67 l/h	60 cm	90%	580	582	584	585	590

Max pressure: 0.8 bar per 8 mil

* Max pressure for thickness equal or greater than 18 mil

Neptune is also available with other emitters and different spacing. Ask for more information



MEDIUM-HEAVY WALL DRIP-LINES

Medium-heavy wall drip lines (wall thickness from 15 to 30 mil) are characterised by better resistance and higher durability. Neptune, available in a wide range of wall thicknesses, is the best solution in these conditions:

- Reuse: the higher resistance of the wall allows a safe withdrawal and re-installation for several seasons;
- Rocky soil: reduction of damages caused by stones (especially in case of reuse);
- Multi-year crops: higher reliability due to greater resistance of the wall. The slightly larger investment can be shortly recouped;
- Soil infested with insects: reduction of the damages caused by insects;
- Pressure fluctuations: greater resistance to pressure fluctuations due to undulating terrain (where it is possible to accept lower emission uniformity).

You wouldn't think of any other way now!

TESTIMONIAL



Loyd Jordan Farms
Meadow, Texas, USA

"I can get 1,68 metric tons of cotton per hectare with 406 mm of drip water, but only 1,26 metric tons per hectare with 406 mm of pivot water. This means that I can get the same number of bales of cotton from 32 hectares of drip as I can get from 48 hectares of pivots. Why farm more acres for the same result? Yield, and crop per drop, is the bottom line."

cotton

TORO[®]



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