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Biogeosciences Discussions

Interactive comment on "Evolution of the spherical cavity radius generated around a subsurface drip emitter" *by* M. Gil et al.

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* The pots used had a volume of 15 L, but might the size of the pot be decisive in the development of the spherical cavity?

The pot size would have affected the cavity size if the water had reached the walls. If this had occurred, the pressure in the soil would have increased causing the cavity size to increase.

* When Ks was increased, because it was measured with a permeameter in a previous test with the same soil, why was the value of 2.8x10-5 m/s chosen? Was the result of an average of several measures? Why does it coincide with the one used to predict the distribution of the water in units SDI?

The authors worked with this soil previously. Values of Ks measured in the laboratory were on the order of 10-5 m/s. From there, the authors chose 2.8âĂć10-5 m/s because this was the value that fit the data the best.

* Is really significant the uniformity difference between looped and conventional SDI units?

Looped surface drip irrigation units are designed to reduce head losses in those cases were very long laterals are needed. In this case, the usual solution is to feed the unit from both sides, shortening the distance that the water has to cover before it exits through the emitters. The resulting reduction of head losses allows for a greater uniformity. If the unit is fed from only one side, this improvement in uniformity, while still significant in some cases, is reduced.

In contrast, subsurface drip irrigation units are always looped. A flushing pipe is necessary in order to remove the soil that accidentally enters inside the laterals. Thus, they are usually fed from one side (feeding pipe).

If they were not looped, these SDI units would be less uniform. The significance of this change would depend (as in surface units) on many factors such as pipe/lateral lengths, diameters, slopes, etc.

* Initially, the authors noted that hs is very sensitive to r0. It has been shown that r0 is strongly influenced by q, then one would expect that in hs also observed this effect of q, however, in figure 7, although hs increased with q, from 5 L/h, but no significant differences, although the amounts are doubled (from 0.5 to 1.0 m), how was expected to be the values of hs?

This is a very interesting question. The phenomenon studied in this paper is very complex, as there are three distinct interdependent variables (r0, hs, and q).

As the referee mentions, hs is very sensitive to changes in r0, and r0 is strongly affected by q. However, the authors obtained very similar hs values. This occurred due to

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the direct relationship of q and r0 within the testing range and the constant inverse relationship of r0 and hs. Thus, the higher the q, the higher r0 is achieved and the resulting lower hs occurred.

However, this increase of r0 is not constant, as shown in Fig. 3; r0 has a linear increase with q until it stabilizes. Then, r0 becames steady, resulting in an increase in hs with q as the referee was expecting.

* Page 1943, line 6, there is an error in the nomenclature: "... and its variability for the variable case CVr0 (coefficient of variance of the cavity radius). Two...".

The authors appreciate this correction and it will be reflected in the final version.

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