



Rules of Irrigation System, Water Requirement and Interval between Irrigation in Greenhouse

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Greenhouse technology is an emerging field and is likely to hold the key to crop production of future. Protected agriculture and greenhouse technology is a conglomeration of various fields of agriculture, basic science and engineering. The subject draws information from the fields like agricultural sciences, agricultural engineering, horticultural sciences, civil engineering, environmental engineering, plasticulture, material science, instrumentation, computers, economics, marketing and management.

Greenhouse crops are irrigated by means of applying water to the media surface through drip tubes or tapes, by hand using a hose, overhead sprinklers and booms or by applying water through the bottom of the container through subirrigation, or by using a combination of these delivery systems.

Rules for irrigations system used in greehouse are as follow

Rule 1: Use a well-drained substrate with good structure If the root substrate is not well drained and aerated, proper watering cannot be achieved. Hence substrates with ample moisture retention along with good aeration are indispensable for proper growth of the plants. The desired combination of coarse texture and highly stable structure can be obtained from the formulated substrates and not from field soil alone.

Rule 2: Water thoroughly each time Partial watering of the substrates should be avoided; the supplied water should flow from the bottom in case of containers, and the root zone is wetted thoroughly in case of beds. As a rule, 10 to 15% excess of water is supplied. In general, the water requirement for soil based substrates is at a rate of 20 l/m

Rule 3: Water just before initial moisture stress occurs Since overwatering reduces the aeration and root development, water should be applied just before the plant enters the early symptoms of water stress. The foliar symptoms, such as texture, colour, and turgidity can be used to determine the moisture stresses, but they vary with crops. For crops that do not show any symptoms, colour.

Irrigation water requirement

The irrigation water requirement is calculated based on the cumulative evapotranspiration and infiltration losses. and other conveyance losses while application. It is mainly depend on type of soil, crop, climate, water application method, field application efficiency, conveyance efficiency, water quality and growth stage of crop.



Determination losses while application of irrigation water in small area are not so easy. Now a days using advance instruments the soil moisture status in root zone is recorded and analyzed with computer programme and accordingly the water application systems. are operated by computerized programme in modern high tech greenhouse.

Daily crop water requirements for different growing system in greenhouse

System/Crop	Amount of water required (litre/MF)	Remarks
Pot Plants	20.64	Twice a day
Bench Crops	16.50	Twice a day
Bedding Crops	20.64	Twice a day
Tomatoes	10.32	On every alternate day
Roses	28.98	Three times a day
Mums, Hydrageas	61.92	Three times a day

Interval between irrigation in greenhouse

Irrigation Interval is the number of days between two consecutive irrigations , $i = d/ETc$

Where, d is net depth of irrigation dose in millimeters

Etc is the daily crop evapotranspiration in millimeters/day

Irrigation scheduling is generally explained as “applying the right amount of water at the right time.” Most plants use more water on hot, sunny days than cool, overcast days. The moisture needs of crops vary with their stage of growth with larger plants needing more water than smaller ones. The season of the year also affects the water requirements of the crop.

Most greenhouses successfully monitor irrigation efficacy based on the feel and appearance of the plants and the growing medium. The best technique is to observe the relative ease with which water can be squeezed from the medium and attempt to correlate this moisture condition with plant appearance and container weight. This process requires a lot of experience and is very subjective but can be very effective when used by a knowledgeable, experienced nursery manager.

Irrigation interval under various soil

Climate/Soil	Very coarse No water holding capacity	Light sandy	Heavier coarse And clayey soil
Hot and Dry	Pulse irrigation during the dry or once a day, when plant are using most water	One dry interval or two days when some silt or clay present in soil	Two or three intervals in heavy soils which have poor aeration
Moderate	Pulse irrigation during the day or once a day when plants are using most water	Two or three days interval	Three to four days
Cool	Pulse irrigation during the dry or once a day, when plants are using more water	Three to four days provided. Their may be some water holding capacity	Six to eight days interval