II.4 Rockwool as a Substrate for Greenhouse Crops

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1 Introduction

In the Scandinavian countries, the first crops were grown on rockwool in the beginning of the 1970's. From 1975, rockwool was used by Dutch growers, and soon a growing system was developed for fruit vegetable crops, like tomato, cucumber, sweet pepper, and eggplant. Later, systems were developed also for cut flowers, like gerbera, rose, and carnation. In the meantime systems came into being for plant propagation, rooting of cuttings, and growing of container plants. For these purposes, propagating cubes, plugs, and granulated rockwool were produced.

At present over 3000 ha of greenhouse crops are grown on rockwool slabs in the Netherlands. The reason that within a few years Dutch growers changed from soil growing to growing on rockwool lies in the very good results obtained with the latter growing system. Growing on rockwool has proved to be a safe, practicable, economic, and high-yielding system.

In this chapter, the system will be described as developed in the Dutch horticulture industry. The contents of this chapter are based on a lecture delivered at the Symposium on High Technology in Protected Cultivation, Tokyo, 1988 (Sonneveld 1988).

2 Rockwool

Rockwool is mostly made of diabase and limestone. These raw materials are melted with coke at a temperature of 1600 °C. The liquid material is poured onto a fast-running disc in a spinning chamber to form fibers. The fibers are supplied with wetting agent, pressed to a certain density, and stabilized with a special binder to slabs. The slabs have a stable structure, are very porous, and have a high water retention capacity. The water retention capacity is determined by the thickness of the fibers, the density of the fibers in the slabs, and the amount of the binder and wetting agent added. Slabs of different qualities are used for horticultural purposes. In Fig. 1 the water retention capacities of two different types of rockwool slabs are shown at pressure head values between 0 and -25 cm. The water retentivity curves show that a great difference in water retention capacity may exist between different rockwool qualities. The wetting curves differ strongly from the drying curves. Under growing conditions the water retention capacity will mostly fluctuate between the two curves.

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Fig. 1. The water retention curves of two types of rockwool slabs of 7.5 cm thickness. For both trade marks the type for more than 1 year use is shown.