

Excessive nitrogen causes poor coloring of tomato

CASES of poor coloring in tomato were recently found in several fields in southeast Taiwan. The symptoms were new to these farmers, who could not even give them a name. Four fruits with poor color can be seen on the right side of Fig. 1. The two on the left are normal.

Tomato fruits with this coloring problem occur throughout the harvest period, but seem more common near the beginning. In a seriously affected field, as many as 60% of the tomatoes may have the disorder.

These abnormal fruits do change color, but in an unusual way. The first part of the fruit to change color is the blossom end (i.e. the end furthest from the stem). Parts

of the body of the fruit will then change color, but there will be a distinct margin between the colored and the green part. There is no gradual color change (see Fig. 1). If the fruits are treated with ethylene to advance their ripening, the green parts will never turn red.

The pericarp of the green part of each fruit contains hard, brown vessels (Fig. 2). The flavor and texture of the tomatoes affected in this way are poor. There is little market demand for them, so if a high proportion of tomato fruit shows these symptoms, the farmer's income is likely to be very low.

A field trial showed that excessive applications of



Fig. 1. Tomato fruit. The four on the right show poor coloring. There is no gradual transition between the red and green color. The two tomato fruit on the left are normal.

nitrogen fertilizer were causing the problem. The field trial was repeated, with the same result.

Usually the amount of nitrogen fertilizer recommended for tomato fields is 150-200 kg/ha, plus a basal application of 2 mt/ha of compost. The nitrogen content of compost is about 0.5% in an average of 70% dry matter. This means that the total nitrogen supplied in compost is 70 kg/ha in each cropping season.

Recently, some farmers have been using only 400-600 kg/ha of compost in order to save labor, but have been applying commercial fortified compost which contains 2%-6% of nitrogen, depending on the brand. This means that such compost now supplies 70-210 kg of nitrogen to the field, instead of 70 kg. If farmers who use such compost are not very careful to apply only small amounts of chemical fertilizer, the tomato fruits growing in their fields

are likely to have problems of poor coloring.

The hard brown vessels begin to form when the fruits are still developing, before they change color. They are the reason why tomatoes with poor coloring are smaller than normal ones.

How these hard brown vessels retard the normal ripening process and prevent the green pericarp from changing color is not yet known. The mechanism by which excessive nitrogen causes poor coloring in tomato is still unknown.

However, the results of experiments tell us that growers should take into account all the nutrients in compost, especially the nitrogen, when planning fertilizer applications for their tomato fields, in order to avoid excessive nitrogen.



Fig. 2. The pericarp of the green part of the tomato fruit is full of hard, brown vessels. These vessels develop during the growth period of the fruit, and affect its size and color.