A new dominant-acting necrosis mutation in pea

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The *necrosis* phenotype in pea consists of a relatively small class of mutations. The majority of these mutations produce small necrotic spots or marginal stripes on leaves and stipules. The spots and stripes may be of different color — from yellow to orange or dark brown. In some mutants the spots can enlarge and form necrotic sectors on the leaves. The well-known *necrosis* mutations are: *nec* (6), *necrosis* of leaf and stipule margins, that covers the intervenial area as well as the veins; *len* (4), *leaf-edge necrosis*, that forms a necrotic spots or areas at the leaflet margins; *gn* (7), *gold necrosis*, which forms the gold orange spots and areas on underside of the leaflets; *brz* or *dgl* (2,3), *bronze* or *degenerating leaves*, which forms deep-yellow to dark-brown growing necrotic spots or areas on older leaves and stipules, caused by the excessive iron accumulation in some cells of pea shoot tissues (1); and *bulf* (5), *burnt leaf*, that causes brown necrotic stripes on the periphery of leaflets and stipules. All of these mutations are recessive in nature. In the present work I describe a dominant EMS-induced mutation associated with leaf necrosis. During the screening of an M_2 progeny of the EMS-treated line SGE, the SGE–1002 mutant was isolated. This mutation is characterized by the presence of dry, pale-yellow sectors on leaflets and stipules. Tissues in these areas look like leaf lamina of the mature pea plants that have naturally senesced (Fig. 1, 2).

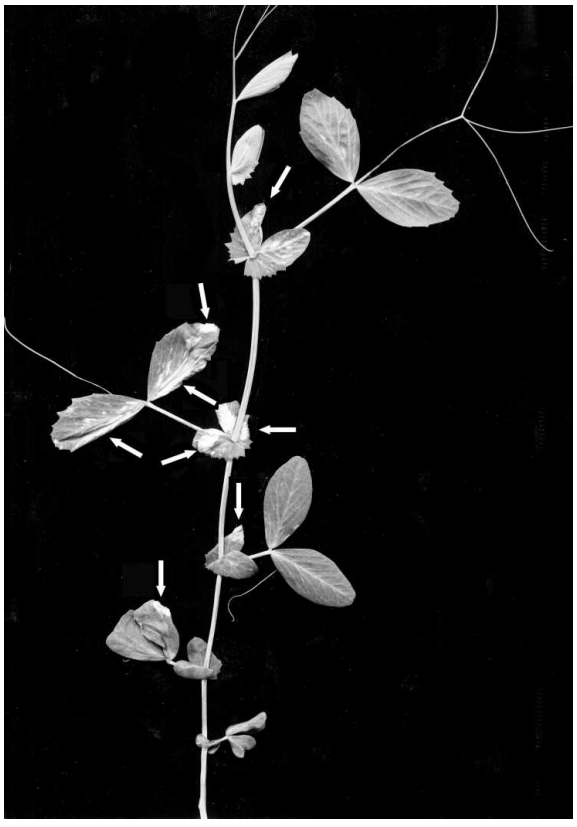

Fig. 1. A plant of SGE–1002 line, showing the dry necrosis phenotype. Arrows point to the dry pale-yellowish sectors of the naturally senesced tissues.

The dry necrotic lesions on leaflets and stipules in the SGE–1002 mutant line appear very quickly and spontaneously: one day the leaflets or stipules are normal and green, without any visible defects, the next day the almost dry pale-yellowish sectors are present. Dry necrotic sectors in the SGE–1002 mutants can

Fig.2. A leaf of the SGE–1002 mutant. The dry necrotic sectors are clearly visible as the light areas.

cover from about $^1/_{10}$ to about $^1/_5$ of the leaf area. I have not observed this type of lesion on stems, inflorescences, flowers or pods. Fertility of the SGE-1002 mutant is nearly the same as that of the parental SGE line; no aborted embryos are observed in the pods.

The SGE–1002 mutant line was crossed with its parental line SGE. All 11 F_1 plants obtained in this cross had similar easily visible dry necrotic sectors, like the SGE–1002 mutant. The following segregation was observed in F_2: 189 plants with dry necrotic sectors: 58 normal plants. This ratio does not deviate significantly from 3:1 ($\chi^2_{3:1}$ = 0.487, $0.5 < p < 0.6$).

Thus, we have a case of a dominant mutation affecting only the lamina photosynthetic structures of pea (leaflets and stipules). Dominant alleles very rarely occur in artificial mutagenesis, such as EMS or X-ray treatment, making the SGE–1002 dry necrosis mutant of special interest. This type of necrosis has not been previously described in pea. Although allelism tests have yet to be performed with *nec*, *len*, *gn*, *bulf*, *brz*, and *dgl*, I am suggesting that the mutation probably affects a new locus. Unfortunately, the location of this mutation on the pea genetic map is still unknown, but this work is in progress.

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A new mutation in pea affecting tendrils (*taa*): lateral tendrils grow at an acute angle

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Several mutations in pea affecting tendril development have been described previously. These include the dominant gene *Twt*, that curls tendrils into compact glomerules (1,2); *bulf*, which causes the ends of tendrils to dry out (3); and two well-known homeiotic mutants, *tl* and *af*, which, respectively, transform tendrils to leaflets or vice versa (4,5).

During the screening of an M_2 progeny of the EMS-treated SGE line a new mutant SGE-0274 was isolated, characterized by an unusual form of tendrils (Fig. 1). The lateral tendril branches of this mutant