In vitro organogenesis in two dioecious species, *Rumex acetosella* L. and *R. acetosa* L. (Polygonaceae)

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Abstract. Callus cultures were established from dioecious plant species *Rumex acetosella* and *R. acetosa*, using cotyledons, hypocotyls and stem tips of aseptically germinated seedlings as primary explants. Cultures were also established from male and female *R. acetosella* adult plants, starting from vegetative lateral buds. Cell division was induced using a high 2,4-D concentration, while bud induction and multiplication were stimulated on a medium with high BAP/IAA ratio. Cotyledon fragments of both species produced only rhizogenic calli. Hypocotyl-derived calli of *R. acetosella* produced buds, while those of *R. acetosa* showed no bud forming response under these conditions. Bud multiplication occurred in stem tip cultures of both species and in lateral bud cultures of *R. acetosella*. Calli derived from male plants produced more buds than those from female. Shoots were easily rooted using IBA, and plantlets were effectively transferred to soil. Flowering was not induced in culture. The sex of regenerated male and female plants was not altered by the culture conditions.

Introduction

Dioecious species represent an interesting plant group suitable for studies on hormonal regulation of sex expression. Such studies may entail either analyses of endogenous hormone content or application of exogenous growth regulators [1]. Whichever approach is chosen, genetically uniform plant samples are desirable. Field-grown plants cannot satisfy this requirement, because of obligate cross-pollination and hence, heterozygosity. Therefore, the feasibility was explored of obtaining in vitro clones of female and male plants, which could be used in further investigation. An additional advantage of such a technique is that juvenile plants, whose sex is known before morphological sex features become apparent, could be used in experiments. The genus *Rumex* comprises several species with genetically determined...
Figs. 1–6. Organogenesis in *Rumex acetosella*. Explants were cultured for 5 days on a medium supplemented with 5 mg l\(^{-1}\) 2,4-D and 0.1 mg l\(^{-1}\) kinetin, and then transferred to 0.17 mg l\(^{-1}\) IAA and 2.2 mg l\(^{-1}\) BAP. 1. Callus derived from a cotyledon explant, showing rhizogenesis in the 3rd subculture. 2, 3. Hypocotyl-derived calli with buds in successive stages of development during the first subculture. 4. A hypocotyl-derived callus with abundant buds in the 5th subculture. 5. Adventitious roots produced by short treatment with 25 mg l\(^{-1}\) IBA, followed by hormone-free medium, 3 weeks after induction. 6. A rosette plant transferred to the soil.