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New *Cordyceps militaris* strains by crossing single ascospores and PCR determination of their mating types

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Cordyceps militaris, an entomopathogenic fungus is being studied and artificially cultivated as a medicinal mushroom having many valuable biological and pharmaceutical activities, substituting C. sinensis which has been traditionally used as a Chinese herb medicine. *C. militaris* is bipolar heterothallic and has two monokaryotic strains of compatible mating types, which are determined by the single mating type locus MAT-1 consisting of two dissimilar alleles called idiomorphs MAT1-1 and MAT1-2. Isolated ascospore monokaryons were identified on the basis of crossing, fruiting body formation ability and the production of perithecia. Each isolate was determined to be monokaryotic or dikaryotic on the basis of perithecial formation by fruiting tests. Such process is very laborious and time consuming to carry out, but molecular markers of these mating types reduce the amount of effort required for the crossing process. In the PCR tests, two opposite mating types were assayed using two sets of primers specific for *C. militaris*, which were amplified a 191-bp fragment for MAT1-1 and 233-bp fragment for MAT1-1. After the multiplex PCR assays for the rapid detection, 8 MAT1-1 and 7 MAT1-2 were detected and most of 56 mating combinations resulted in F1 hybrids with well-developed perithecial fruiting. Out of 56 hybrids screened, two strains were selected producing high quality club-shaped, bright orange-red fruiting bodies with high cordycepin contents. These new strains may serve as a valuable one for artificial cultivation and industrial-scale production of *C. militaris*.

Biography

Byungjoo Lee completed his PhD from Chungnam National University and he is an Agricultural Researcher in the Crop Research Division, Chuncheongnam-do Agricultural Research & Extension Services in South Korea for about 20 years and has his expertise in breeding new mushroom cultivars. Recently, he got involved in environmental friendly disease and pest management, particularly against mushroom flies. He investigates the occurrence and development of sciarid flies and the use of plant extracts such as Ginko biloba fruits to control mushroom flies in button mushroom cultivation.

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