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Genetic Polymorphism of *Dolichos biflorus* L. in India at the Seed Storage Level

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Abstract

Horse gram, *Dolichos biflorus* L., is cultivated in many drought prone regions of eastern India by poor farmers. The nutritional and medical values of horse gram have been reported by scientific groups. Apart from the traditional agricultural aspects of seed storage proteins, these seeds are rich in lectins. Lectins are carbohydrate-binding proteins or glycoproteins which are highly specific for their sugar moieties. Lectins occur ubiquitously in nature. They may bind carbohydrate moiety as such free in solution or carbohydrate moiety which is a part of protein/particulate body. They agglutinate cells and/or precipitates glycoconjugates.

Horse gram lectins (DBA) show specificity towards sugar moieties like N-acetyl Galactosamine. DBAs are differentially expressed in seeds, stems, leaves, and roots. The seed lectin and plant lectin genes are different in 116-bp 5'-upstream region. Recently the crystal structure of horse gram plant lectins has generated considerable interest in the scientific community. The unusual quaternary structure variation observed in this group of lectin raises possibilities for the role of DBAs in receptor cross-linking and simultaneous signal transduction from multiple receptors on the cell surface. DBAs are widely used as markers for neuronal pathways, kidney, red blood cells, T-cells, and other epithelial cell surfaces in the mammalian body.

In order to identify the structural variation in the polypeptide sequence of these lectins, a field collection of different horse gram cultivars from ethnic farming communities of eastern India was undertaken. A total of 40 germplasms were collected with the presumption, that seeds have been used long time by these farmers. Cumulative stress from associated environmental factors over a long duration may have influenced the lectin dimmers either at the nucleotide or polypeptide level. Our results showed that the 40 cultivars can be grouped into five groups. Further characterisation of these germplasms at the molecular level is ongoing.

Keywords: *Dolichos biflorus*, genetic polymorphism, horse gram, lectin