中国农业科学 2009,42(1):162-172
Scientia Agricultura Sinica doi: 10.3864/j.issn.0578-1752.2009.01.020

叶面肥的营养机理及应用研究进展

李燕婷[1]，李秀英[1]，肖 艳[2]，赵秉强[1]，王丽霞[1]

（[1]中国农业科学院农业资源与农业区划研究所/农业部植物营养与养分循环重点开放实验室，北京 100081；
[2]北京新禾丰农化资料有限公司，北京 100098）

摘要：综合评述了植物叶面营养机理以及叶面肥应用的研究进展。植物叶片与根一样可以吸收利用养分，叶片对养分的吸收主要是通过叶面气孔和表皮亲水小孔进行的，还可以通过胞间连丝进行主动吸收。植物种类及其生长状况、叶面喷施液的组成与养分元素的性质以及温度、光照等环境条件都影响叶面养分的吸收与利用。叶片类型及叶表蜡质层结构与组成的不同造成双子叶植物叶面施肥效果好于单子叶植物，甚至同种类不同品种的植物叶面养分吸收也不同；植物生长时期不同叶面肥施用效果也不同；表面活性剂等助剂因可以提高叶面喷施效果而成为叶面肥中不可缺少的成分，但通常沿用农药中常用的活性剂种类，由于成分间相溶性差而影响叶面喷施效果。叶面营养机理的研究推动了叶面肥的发展与应用，叶面施肥逐渐成为现代农业中一项重要的施肥措施，但因其施肥量有限只能作为土壤施肥的一种有效辅助措施而不能代替土壤施肥。近年来，中国叶面肥产品数量和种类增长迅速，但产品质量较差，使用技术也有待提高。在今后的发展中，应加强叶面营养机理以及助剂等物质的研究与应用，提高产品质量和施用效果，强化专用叶面肥研究，优化和推广叶面肥施用技术。

关键词：植物营养；叶面营养；叶面肥；叶面施肥

Advances in Study on Mechanism of Foliar Nutrition and Development of Foliar Fertilizer Application

LI Yan-ting[1], LI Xiu-ying[1], XIAO Yan[2], ZHAO Bing-qiang[1], WANG Li-xia[1]

([1]*Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences/Key Laboratory of Plant Nutrition and Nutrient Cycling, Ministry of Agriculture, Beijing 100081*; [2]*Beijing Xinhefeng Agrochemical Co.,Ltd. Beijing 100098*)

Abstract: Advances in study of mechanisms of foliar nutrition and foliar fertilizer application were reviewed. Plant leaves can absorb nutrients as roots do. There are two basic pathways for nutrients entering into the plant tissue: one is through the stomata and the other is via cuticle hydrophilic pores. Some plant leaves also can absorb nutrients actively through plasmodesmata. So the foliar uptake of nutrients depends upon plant types and the state of plants growth, composition of foliar fertilizer, characters of nutrients and environmental factors such as temperature, illumination and so on. Foliar application to dicotyledon is better than to monocotyledon because of different leaf types and structures of surface wax, and of different varietals plants of homogeneity. It is necessary to spray right fertilizers at right stage of plant growth. Some assistants, such as surfactants are required to enhance nutrients absorption in foliar fertilizers, however, most of the surfactants have a poor solubility among compositions of foliar fertilizers as they are pesticides surfactants. The development of foliar application was promoted by the research on mechanism of foliar nutrition, and now foliar application is becoming an important fertilization method. But soil application can not be replaced by foliar application of fertilizers. Foliar spray can be only as an efficiency assistant method to soil application because the quantity of nutrients supplied is limited. In recent years, foliar fertilizers developed promptly both in quantity and variety, but the quality is poor in China. So the techniques of foliar application need to be improved. Scientists should intensify their research on the mechanism of foliar nutrition and the utilization of assistants in foliar fertilizers. In future, it is necessary to enhance the quality of foliar fertilizers and foliar

收稿日期：2008-01-22；**接受日期：**2008-10-15
基金项目：中央级公益性科研院所基本科研业务费专项资金项目（2007-32），国家科技支撑计划项目（2006BAD10B03）
作者简介：李燕婷（1971－），女，山东郯城人，副研究员，博士，研究方向为植物营养与新型肥料。Tel：010-82108664；Fax：010-82108664；E-mail：ytli@caas.ac.cn