

论文

土壤、农作物中及家畜体内的微量营养元素

摘要:

微量营养元素通常富集在表层土壤中,其含量随土层深度递减。尽管土壤中大多数微量元素的含量很高,但只有一小部分能被植物吸收。微量营养元素,也被称为痕迹元素,所需数量微小,但其缺乏会对农作物生产和动物健康造成严重影响。农作物对不同微量营养元素有着不同的反应。芸苔和豆类对Mo和B有较高的响应度,而玉米和其他谷类对Zn和Cu较为敏感。在温润和湿热地区,由于强降雨和强淋溶作用,微量营养元素缺乏较为普遍。土壤pH值是影响微量营养元素对植物有效性的一个重要因素之一。除Mo以外,微量营养元素的有效性随pH的增加而减小,Mo的有效性随pH的增加而增加。对于大多数植物来说,叶片中的微量营养元素含量高于植物的其他部分。因此,可以用叶片作为样品来测定农作物中微量营养元素的含量。大多数微量营养元素缺乏表现在植物顶部的新叶上,而过量则表现在老叶上。根据Deckers和Steinnes的结论,土壤较为贫瘠的发展中国家与土壤肥沃的欧洲及北美地区相比,微量营养元素缺乏现象较为普遍。许多营养元素缺乏区位于潮湿的热带地区,土壤极度贫瘠、高度风化和/或强淋溶,营养元素十分匮乏。此类其他土壤分部于半干旱及毗邻地区,这些地区的碱性和石灰性土壤条件严重限制了微量营养元素对植物的供给。通常,可以满足草料作物生长的Cu、Fe、Mn、Zn、Se含量水平,却不能满足家畜的需要。Se是植物生长所不需要的微量元素,因此草料作物中Se的含量很少。然而,如果动物所食农作物和草料中Se含量偏低,会造成严重的肌肉异常和其他疾病。白肌病是最常见的由于Se缺乏造成的疾病,在牛犊和羔羊中都有发现。本文讨论了与动物需求相关的农作物微量营养元素充足度。

关键词: [微量营养元素](#); [微量营养元素影响](#); [土壤](#); [农作物](#); [家畜](#)

Micronutrients in soils, crops, and livestock.

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Abstract:

Micronutrient concentrations are generally higher in the surface soil and decrease with soil depth. In spite of the high concentration of most micronutrients in soils, only a small fraction is available to plants. Micronutrients, also known as trace elements, are required in microquantities but their lack can cause serious crop production and animal health problems. Crops vary considerably in their response to various micronutrients. Brassicas and legumes are highly responsive to molybdenum (Mo) and boron (B), whereas corn and other cereals are more responsive to zinc (Zn) and copper (Cu). Micronutrient deficiencies are more common in humid temperate regions, as well as in humid tropical regions, because of intense leaching associated with high precipitation. Soil pH is one of the most important factors affecting the availability of micronutrients to plants. With increasing pH, the availability of these nutrients is reduced with the exception of Mo whose availability increases as soil pH increases. In most plant species, leaves contain higher amounts of nutrients than other plant parts. Therefore, whenever possible, leaves should be sampled to characterize the micronutrient status of crops. Deficiency symptoms for most micronutrients appear on the younger leaves at the top of the plant, whereas toxicity symptoms generally appear on the older leaves of plants. As summarized by Deckers and Steinnes, micronutrient deficiencies are widespread in developing countries, which have much poorer soil resources than the fertile soils of Europe and North America. Many of these areas lie in the humid tropics with extremely infertile, highly weathered, and/or highly leached soils, which are intensely deficient in nutrients. The rest of such soils are in the semiarid and areas adjacent to the latter, where alkaline and calcareous soil conditions severely limit the availability of micronutrients to plants. Frequently, the Cu, iron (Fe), manganese (Mn), Zn, and selenium (Se) levels in forages, which are sufficient for optimum crop yields, are not adequate to meet the needs of livestock. Selenium is a trace mineral, which is not required by plants, and maximum forage yields can be obtained on soils with very low amounts of soil

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Se. However, if animals are fed feed crops and forages with low Se, they could suffer from serious muscular disorders and other diseases. White muscle disease caused by Se deficiency is the most common disorder and is found in calves and lambs. Sufficiency levels of micronutrients for crops have been discussed in relation to the animal requirement.

Keywords:

Key words: micronutrients; influence of micronutrient; soil; crop; livestock

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