

# 苏南稻田 4 种冬绿肥养分特性及对翻压前土壤无机氮的影响

白金顺<sup>1</sup>, 曹卫东<sup>1,3\*</sup>, 樊媛媛<sup>2</sup>, 高嵩涓<sup>1</sup>

(1 农业部植物营养与肥料重点实验室, 中国农业科学院农业资源与农业区划研究所, 北京 100081;

2 中国农业大学资源与环境学院, 北京 100193; 3 青海大学, 西宁 810016)

**摘要:** 为充分利用苏南冬闲稻田发展适宜绿肥作物种植, 在大田试验条件下, 研究了毛叶苕子 (*Vicia villosa* Roth)、光叶苕子 (*Vicia villosa* var.)、紫云英 (*Astragalus sinicus* L.) 和肥田萝卜 (*Raphanus sativus* L.) 4 种绿肥作物的生长、营养特性, 比较分析了绿肥作物翻压前不同处理间耕层土壤无机氮含量与构成的差异。结果表明, 在绿肥作物翻压期 4 种绿肥作物均达到较高生物量和养分累积量, 鲜重、干重分别为 24.8 ~ 30.7 t/hm<sup>2</sup> 和 3.6 ~ 4.2 t/hm<sup>2</sup>, 不同绿肥作物间无显著差异。4 种绿肥作物的吸氮量为 69.8 ~ 136.4 kg/hm<sup>2</sup>, 毛叶苕子最高, 肥田萝卜最低。吸磷量为 7.1 ~ 11.3 kg/hm<sup>2</sup>, 肥田萝卜最高, 紫云英最低。吸钾量为 117.6 ~ 151.3 kg/hm<sup>2</sup>, 毛叶苕子最高, 光叶苕子最低。与对照冬闲相比, 种植绿肥作物不同程度地降低了耕层土壤无机氮含量 (平均降低 38.9 kg/hm<sup>2</sup>), 其中硝态氮含量下降明显, 铵态氮含量均较对照土壤有增加趋势 (平均提高 6.5 kg/hm<sup>2</sup>), 毛叶苕子和光叶苕子处理铵态氮含量增加显著。4 种绿肥作物均适合苏南冬闲稻田种植, 能潜在降低无机氮的损失风险和为后季水稻作物生长提供养分。

**关键词:** 冬闲稻田; 绿肥作物; 品种; 养分特性; 土壤无机氮

中图分类号: S142; S153.6

文献标识码: A

文章编号: 1008-505X(2013)02-0413-07

## Nutrient characteristics of four kinds of winter green manure and their influences on soil mineral nitrogen before incorporation

BAI Jin-shun<sup>1</sup>, CAO Wei-dong<sup>1,3\*</sup>, FAN Yuan-yuan<sup>2</sup>, GAO Song-juan<sup>1</sup>

(1 Key Laboratory of Plant Nutrition and Fertilizer, Ministry of Agriculture/Institute of Agricultural Resources and Regional

Planning, China Academy of Agricultural Sciences, Beijing 100081, China; 2 College of Resources and Environmental

Sciences, China Agricultural University, Beijing 100193, China; 3 Qinghai University, Xining 810016, China)

**Abstract:** In order to replace the winter bare fallow with green manure crop in rice cropping system in South of Jiangsu province, the field experiment was carried out to investigate the growth and nutrient characteristics of hairy vetch (*Vicia villosa* Roth), smooth vetch (*Vicia villosa* var.), milk vetch (*Astragalus sinicus* L.) and radish (*Raphanus sativus* L.) as winter green manure crops and their influences on soil mineral nitrogen before incorporation. The results showed that four kinds of green manure crops in our study all produced relatively high aboveground biomass and N, P, K nutrients accumulation, the fresh and dry biomass ranged from 24.8 t/ha to 30.7 t/ha and from 3.6 t/ha to 4.2 t/ha individually. No significant differences were found among different green manure crops. The nitrogen uptake ranged from 69.8 for radish to 136.4 kg/ha for hairy vetch. The phosphorus uptake ranged from 7.1 for radish to 11.3 kg/ha for milk vetch. The potassium uptake ranged from 117.6 for

收稿日期: 2012-08-17

接受日期: 2012-11-09

基金项目: 公益性行业(农业)科研专项“绿肥作物生产与利用技术集成研究及示范(201103005)”; 中央级公益性科研院所基本科研业务费专项资金(中国农业科学院农业资源与农业区划研究所 202-6); 太湖小流域生态农业建设技术模式研究与示范(TH2011206)项目资助。

作者简介: 白金顺(1979—)男,山西忻州人,助理研究员,主要从事养分资源管理与绿肥生产利用研究。E-mail: baijs@caas.ac.cn

\* 通信作者 Tel: 010-82106733, E-mail: wdcao@caas.ac.cn