



ISSN 0496-3490  
CODEN TSHPA9

# 作物学报

## ACTA AGRONOMICA SINICA

第43卷 第4期 Vol. 43 No. 4



中国作物学会 中国农业科学院作物科学研究所 主办  
Sponsored by Crop Science Society of China and  
Institute of Crop Science, CAAS  
科学出版社 出版  
Published by Science Press

4  
2017

# ACTA AGRONOMICA SINICA

Vol. 43 No. 4 April 2017

## CONTENTS

### CROP GENETICS & BREEDING • GERMPLASM RESOURCES • MOLECULAR GENETICS

- 473 **Identification and Gene Mapping of Starch Accumulation and Early Senescence Leaf Mutant *es19* in Rice**  
XIAO Yan-Hua, CHEN Xin-Long, DU Dan, XING Ya-Di, ZHANG Tian-Quan, ZHU Mao-Di, LIU Ming-Ming, ZHU Xiao-Yan, SANG Xian-Chun, and HE Guang-Hua
- 483 **Linkage Analysis and Genome-Wide Association Study of QTLs Controlling Stem-Breaking-Strength-Related Traits in Wheat**  
LIU Kai, DENG Zhi-Ying, ZHANG Ying, WANG Fang-Fang, LIU Tong-Tong, LI Qing-Fang, SHAO Wen, ZHAO Bin, TIAN Ji-Chun, and CHEN Jian-Sheng
- 496 **Mapping QTLs for Awn Length in Recombinant Inbred Line Population Derived from the Cross between Common Wheat and Tibetan Semi-wild Wheat**  
GONG Xi, JIANG Yun-Feng, XU Bin-Jie, QIAO Yuan-Yuan, HUA Shi-Yu, WU Wang, MA Jian, ZHOU Xiao-Hong, QI Peng-Fei, and LAN Xiu-Jin
- 501 **Quality Characteristics of Winter Wheat Varieties Tested in National Trials in Northern Region and Yellow-Huai River Valley Winter Wheat Zone from 2000 to 2015**  
HU Xue-Xu, SUN Li-Juan, ZHOU Gui-Ying, WU Li-Na, LU Wei, LI Wei-Xi, WANG Shuang, YANG Xiu-Lan, SONG Jing-Ke, and WANG Bu-Jun
- 510 **Molecular Cloning and Functional Identification of Peroxidase Gene *ScPOD02* in Sugarcane**  
SU Ya-Chun, WANG Zhu-Qing, LI Zhu, LIU Feng, XU Li-Ping, QUE You-Xiong, DAI Ming-Jian, and Chen Yun-Hao
- 522 **Genetic Analysis and Gene Mapping of *Yellow leaf and dwarf (yld)* Mutant in Rice**  
LI Zi-Zhuang, XU Qian-Kun, YU Hai-Ping, ZHOU Ting-Ting, XUE Da-Wei, ZENG Da-Li, GUO Long-Biao, QIAN Qian, and REN De-Yong
- 530 **Analysis of Genetic Diversity in Common Millet (*Panicum miliaceum*) Using Fluorescent SSR in China**  
WANG Rui-Yun, JI Xu, LU Ping, LIU Min-Xuan, XU Yue, WANG Lun, WANG Hai-Gang, and QIAO Zhi-Jun

### TILLAGE & CULTIVATION • PHYSIOLOGY & BIOCHEMISTRY

- 549 **Application of an Improved Method in Retrieving Leaf Area Index Combined Spectral Index with PLSR in Hyperspectral Data Generated by Unmanned Aerial Vehicle Snapshot Camera**  
GAO Lin, YANG Gui-Jun, LI Chang-Chun, FENG Hai-Kuan, XU Bo, WANG Lei, DONG Jin-Hui, and FU Kui
- 558 **Potassium Absorption and Utilization Characteristics of Rice Varieties with the Highest Population Productivity under Corresponding Nitrogen Fertilization in Huaibei Area**  
LIANG Jian, REN Hong-Ru, XIA Min, LI Xiao-Feng, CHEN Meng-Yun, LI Jun, ZHANG Hong-Cheng, and HUO Zhong-Yang
- 571 **Weed Infestation, Soil Moisture, and Temperature under Mulching Cultivation with Different Films and the Effects on Yield and Quality of Potato**  
ZHANG Shu-Min, NING Tang-Yuan, LIU Zhen, WANG Bin, SUN Tao, ZHANG Xue-Peng, HE Zhen-Kun, YANG Yan, and MI Qing-Hua

- |     |  |  |
|-----|--|--|
| 581 | <b>Effect of Mechanical Transplanting with Pothole Seedlings on Grain Quality of Different Types of Rice in Rice-Wheat Rotation System</b> | XING Zhi-Peng, ZHU Ming, WU Pei, QIAN Hai-Jun, CAO Wei-Wei, HU Ya-Jie, GUO Bao-Wei, WEI Hai-Yan, XU Ke, HUO Zhong-Yang, DAI Qi-Gen, and ZHANG Hong-Cheng |
| 596 | <b>Effect of Balanced Fertilizer Application on Crop Yield in Potato-Soybean Relay-Cropping System</b>                                     | CHEN Guang-Rong, WANG Li-Ming, YANG Ru-Ping, DONG Bo, YANG Gui-Fang, ZHANG Guo-Hong, and YANG Wen-Yu   |

## RESEARCH NOTES

- |     |  |   |
|-----|--|---|
| 608 | <b>Differential Expression Characteristics of Proteins Involved in Early Development of Maize Grain</b>  | YU Tao, LI Geng, ZHANG Cheng-Fen, LIU Peng, DONG Shu-Ting, ZHANG Ji-Wang, and ZHAO Bin  |
| 620 | <b>Selection and Cloning of Thaumatin-like Protein (TLP) Gene from Winter <i>Brassica rapa</i> and Its Expression under Low Temperature Stress</b> | MA Li, YUAN Jin-Hai, SUN Wan-Cang, LIU Zi-Gang, ZENG Xiu-Cun, WU Jun-Yan, FANG Yan, LI Xue-Cai, CHEN Qi, XU Yao-Zhao, PU Yuan-Yuan, LIU Hai-Qing, YANG Gang, and LIU Lin-Bo |

## A BRIEF INTRODUCTION OF *ACTA AGRONOMICA SINICA*

*Acta Agronomica Sinica* (*AAS*, ISSN 0496-3490) is a monthly academic journal co-sponsored by Crop Science Society of China and the Institute of Crop Science, Chinese Academy of Agricultural Sciences, under the leadership of China Association for Science and Technology and published by Science Press, Chinese Academy of Sciences. *AAS* was firstly published in 1962. The predecessors were *Chinese Journal of Agricultural Research* started in 1950 and *Acta Agriculturae Sinica* started in 1952. As one of the key scientific journals in China, *AAS* has been financially supported by China Association for Science and Technology since 1997 and the National Natural Science Foundation of China since 2000.

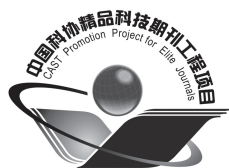
The major aims of *AAS* are to report the progresses in the disciplines of crop breeding, crop genetics, crop cultivation, crop physiology, ecology, biochemistry, germplasm resources, grain chemistry, grain storage and processing, biotechnology and biomathematics etc. mainly in China and abroad. *AAS* provides regular columns for Original papers, Reviews, and Research notes. The strict peer-review procedure guarantees the academic level and raises the reputation of the journal. The readership of *AAS* is for crop science researchers, students of agricultural colleges and universities, and persons with similar academic level.

*AAS* is the leading journal of crop sciences and reflects the latest achievement in all aspects of crop sciences in China. *AAS* occupies the first position on the list of Chinese core journals in "Agronomy and Crops" field. The editorial board consists of 151 specialists in the field of crop sciences. Among them, 24 are academicians of Chinese Academy of Sciences or Chinese Academy of Engineering, 26 are from the outside of China, and 3 are from Hong Kong, China.

*AAS* is a fully Open Access Journal through the independent website (<http://zwx.chinacrops.org/>) since 2004. Free full texts are published online two months earlier than printing version, and all articles of the journal from 1962 are available freely. Manuscript submission, tracking, and peer review process are completed online. The functions of eTOCs (Table of Contents Alerting), advanced paper search, and paper recommendation are available.

*AAS* are indexed in some international index systems, such as AGRIS (FAO), CAB Abstracts and Global Health of Centre for Agriculture and Bioscience International, Cambridge Scientific Abstracts, Chemical Abstracts, Food Science and Technology Abstracts, Index of Copernicus, Japan Science and Technology Agency, and VINITI Abstracts Journal (Russia). *AAS* is also referenced by many domestic databases and abstract periodicals.

The purposes of *AAS* are to enhance the development of crop science and technology in China, to promote nationwide and worldwide academic exchanges, and to accelerate the modernization of Chinese agriculture. *AAS* is distributed in China and abroad. The editorial office appreciates to establish publication exchange relationship with related institutions, agricultural colleges and universities, and international organizations in China and abroad.



# 作物学报

(ZUOWU XUEBAO)

第 43 卷 第 4 期 2017 年 4 月

## 目 次

### 作物遗传育种·种质资源·分子遗传学

- |     |                                       |     |     |     |     |     |     |
|-----|---------------------------------------|-----|-----|-----|-----|-----|-----|
| 473 | 水稻叶片淀粉积累及早衰突变体 <i>es19</i> 的鉴定与基因定位   | 肖艳华 | 陈新龙 | 杜 丹 | 邢亚迪 | 张天泉 | 祝毛迪 |
|     |                                       | 刘明明 | 朱小燕 | 桑贤春 | 何光华 |     |     |
| 483 | 小麦茎秆断裂强度相关性状 QTL 的连锁和关联分析             | 刘 凯 | 邓志英 | 张 莹 | 王芳芳 | 刘佟佟 | 李青芳 |
|     |                                       | 邵 文 | 赵 宾 | 田纪春 | 陈建省 |     |     |
| 496 | 利用普通六倍体小麦和西藏半野生小麦杂交衍生的重组自交系定位小麦芒长 QTL | 宫 希 | 蒋云峰 | 徐彬杰 | 乔媛媛 | 华诗雨 | 吴 旺 |
|     |                                       | 马 建 | 周小鸿 | 祁鹏飞 | 兰秀锦 |     |     |
| 501 | 2000—2015 年北部、黄淮冬麦区国家区试品种的品质特征        | 胡学旭 | 孙丽娟 | 周桂英 | 吴丽娜 | 陆 伟 | 李为喜 |
|     |                                       | 王 爽 | 杨秀兰 | 宋敬可 | 王步军 |     |     |
| 510 | 甘蔗过氧化物酶基因 <i>ScPOD02</i> 的克隆与功能鉴定     | 苏亚春 | 王竹青 | 李 竹 | 刘 峰 | 许莉萍 | 阙友雄 |
|     |                                       | 戴明剑 | 陈允浩 |     |     |     |     |
| 522 | 水稻淡黄叶矮化突变体 <i>yld</i> 的遗传分析及基因定位      | 李自壮 | 徐乾坤 | 余海平 | 周亭亭 | 薛大伟 | 曾大力 |
|     |                                       | 郭龙彪 | 钱 前 | 任德勇 |     |     |     |
| 530 | 利用荧光 SSR 分析中国糜子遗传多样性                  | 王瑞云 | 季 煦 | 陆 平 | 刘敏轩 | 许 月 | 王 纶 |
|     |                                       | 王海岗 | 乔治军 |     |     |     |     |

### 耕作栽培·生理生化

- |     |  |     |     |     |     |     |     |
|-----|--|-----|-----|-----|-----|-----|-----|
| 549 | 基于光谱特征与 PLSR 结合的叶面积指数拟合方法的无人机画幅高光谱遥感应用 | 高 林 | 杨贵军 | 李长春 | 冯海宽 | 徐 波 | 王 磊 |
|     |  | 董锦绘 | 付 奎 |     |     |     |     |
| 558 | 淮北地区氮肥群体最高生产力水稻钾素吸收利用特征                | 梁 健 | 任红茹 | 夏 敏 | 李晓峰 | 陈梦云 | 李 军 |
|     |  | 张洪程 | 霍中洋 |     |     |     |     |
| 571 | 不同类型地膜覆盖的抑草与水热效应及其对马铃薯产量和品质的影响         | 张淑敏 | 宁堂原 | 刘 振 | 王 斌 | 孙 涛 | 张学鹏 |
|     |  | 贺贞昆 | 杨 燕 | 米庆华 |     |     |     |
| 581 | 稻麦两熟制条件下钵苗机插方式对不同类型水稻品种米质的影响           | 邢志鹏 | 朱 明 | 吴 培 | 钱海军 | 曹伟伟 | 胡雅杰 |
|     |  | 郭保卫 | 魏海燕 | 许 轲 | 霍中洋 | 戴其根 | 张洪程 |
| 596 | 平衡施肥对马铃薯-大豆套作系统中作物产量的影响                | 陈光荣 | 王立明 | 杨如萍 | 董 博 | 杨桂芳 | 张国宏 |
|     |  | 杨文钰 |     |     |     |     |     |

### 研究简报

- |     |                             |     |     |     |     |     |     |
|-----|-----------------------------|-----|-----|-----|-----|-----|-----|
| 608 | 玉米籽粒早期发育相关蛋白的差异表达特性         | 于 涛 | 李 耕 | 张成芬 | 刘 鹏 | 董树亭 | 张吉旺 |
|     |                             | 赵 斌 |     |     |     |     |     |
| 620 | 白菜型冬油菜类甜蛋白的筛选、克隆及其在低温胁迫下的表达 | 马 骊 | 袁金海 | 孙万仓 | 刘自刚 | 曾秀存 | 武军艳 |
|     |                             | 方 彦 | 李学才 | 陈 奇 | 许耀照 | 蒲媛媛 | 刘海卿 |
|     |                             | 杨 刚 | 刘林波 |     |     |     |     |