

《中文核心期刊要目总览》收录
Ei Compendex(核心版)收录
百种中国杰出学术期刊
RCCSE中国权威学术期刊

2017. 15
第33卷 VOL. 33



ISSN 1002-6819
CN 11-2047/S
CODEN NGOXEO

农业工程学报

TRANSACTIONS OF THE CHINESE SOCIETY
OF AGRICULTURAL ENGINEERING

NONGYE
GONGCHENG
XUEBAO



ISSN 1002-6819



中国农业工程学会 主办

万方数据

农业工程学报

二〇一七年八月

第三十三卷

第十五期

中国农业工程学会

农业工程学报

2017年8月第15期 总第318期(第33卷)

目次

• 综合研究 • 关键技术 •

中国农村生活垃圾的产生量与物理特性分析及处理建议

.....韩智勇, 费勇强, 刘 丹, 旦 增, 张 蔚, 施国中, 王家雷, 谢燕华 (1)

• 农业装备工程与机械化 •

三移栽臂水稻钵苗移栽机构设计与试验.....吴国环, 俞高红, 项筱洁, 王林伟 (15)

2ZXM-2型全自动蔬菜穴盘苗铺膜移栽机的研制.....李 华, 曹卫彬, 李树峰, 刘姣娣, 陈棒棒, 马晓晓 (23)

混合驱动五杆花卉盘栽机构的优化设计与试验.....赵 雄, 崔海洋, 代 丽, 徐亚丹, 王 川, 沈 锦 (34)

轴流式和切流式机械脱粒对稻谷损伤及加工品质的影响.....李毅念, 陈俊生, 丁启朔, 丁为民 (41)

油菜精量直播机气力式排种系统稳压控制方法与试验

.....廖宜涛, 舒彩霞, 廖庆喜, 韦跃培, 王 磊, 王 都, 郑 娟 (49)

秸秆心土混合犁改良白浆土效果

.....朱宝国, 张春峰, 贾会彬, 王因因, 孟庆英, 匡恩俊, 王秋菊, 高中超, 刘 峰, 张立波, 高雪冬 (57)

基于驻波率原理的农药雾滴沉积量检测系统设计与试验

.....吴亚垒, 祁力钧, 张 亚, 高春花, 李 帅, Elizabeth Musiu (64)

靶向灭草机器人药液喷洒空气动力学模型建立与验证

.....权龙哲, 王建森, 奚德君, 邴亚军, 孙文峰, 陈 词 (72)

果园风送喷雾机导流板角度对气流场三维分布的影响.....吕晓兰, 张美娜, 常有宏, 雷晓晖, 杨青松 (81)

融合激光三维探测与IMU姿态角实时矫正的喷雾靶标检测.....刘 慧, 李 宁, 沈 跃, 徐 慧 (88)

叶片进口安放角对泵作透平外特性影响的数值模拟与验证.....王 桃, 孔繁余, 刘莹莹, 魏启能 (98)

• 农业航空工程 •

适应高原天气与地形的人工增雨无人机研制及试验.....马学谦, 孙安平, 张小军, 韩辉邦 (105)

• 农业水土工程 •

径流泥沙实时自动监测仪的研制.....展小云, 郭明航, 赵军, 赵向辉 (112)

草地植被覆盖度坡度及雨强对坡面径流含沙量影响试验研究

.....王栋栋, 王占礼, 张庆玮, 张琪琳, 田娜玲 (119)

滤纸法测定干湿循环下膨胀土基质吸力变化规律.....吴珺华, 杨 松 (126)

高寒灌区风沙吹蚀对农业水利工程混凝土抗冻耐久性的影响

.....薛慧君, 申向东, 刘 倩, 王仁远, 刘 政, 韩 超 (133)

再生骨料透水混凝土强度及透水性能试验

.....陈守开, 杨 晴, 刘秋常, 郭 磊, 汪伦焰 (141)

工程堆积体坡面植物篱的控蚀效果及其机制研究

.....杨 帅, 高照良, 李永红, 牛耀彬, 王 凯, 白 皓, 齐星圆, 李玉亭婷 (147)

基于位移变化率和强度折减有限元的边坡失稳判定方法.....江胜华, 汪时机, 李伟清, 鲍安红 (155)

近景摄影测量提高裸露地表粗糙度测量精度.....陶浩然, 陈权, 李震, 曾江源, 陈晓宁 (162)

秸秆还田配施氮肥改善土壤理化性状提高春玉米产量

.....白 伟, 安景文, 张立祯, 逢焕成, 孙占祥, 牛世伟, 蔡 倩 (168)

梯形喉口无喉道量水槽设计及其水力性能模拟与试验·····	冉聘颀, 王文娥, 胡笑涛 (177)
仿自然鱼道中卵石墙对池室水力特性改善效果 ·····	李广宁, 孙双科, 柳海涛, 张超, 赵桂侠, 郑铁钢 (184)
基于降水蒸发指数的 1960—2015 年内蒙古干旱时空特征 ·····	张煦庭, 潘学标, 徐琳, 魏培, 尹紫薇, 邵长秀 (190)

• 农业信息与电气技术 •

基于多时相 OLI 数据的宁夏大尺度水稻面积遥感估算 ·····	刘佳, 王利民, 姚保民, 杨福刚, 杨玲波, 王小龙, 曹怀堂 (200)
呼伦贝尔天然打草场分布及生物量遥感估算 ·····	闫瑞瑞, 唐欢, 丁蕾, 姚静, 陈宝瑞, 辛晓平, 王旭, 闫晓红, 牛文远 (210)
基于深度卷积神经网络的番茄主要器官分类识别方法·····	周云成, 许童羽, 郑伟, 邓寒冰 (219)
面向弧齿锥齿轮网络化制造过程的信息集成管理系统 ·····	李聚波, 高振山, 李天兴, 杨建军, 徐爱军, 王斌 (227)

• 农业生物环境与能源工程 •

基于 LabVIEW 平台的蛋鸡舍环境舒适度实时监测系统设计与实现·····	白士宝, 滕光辉, 杜晓冬, 杜欣怡 (237)
日光温室用双集热管多曲面槽式空气集热器性能试验 ·····	陈超, 张明星, 郑宏飞, 李娜, 马兴龙, 凌浩恕, 马彩雯, 邹平 (245)
改性脲醛树脂粘合基质块性能及其对黄瓜幼苗生长的影响·····	曲萍, 赵永富, 宋婧, 夏礼如 (253)
黄原胶溶液模拟消化污泥流动性能分析·····	曹秀芹, 袁海光, 赵振东, 丁浩 (260)
水葫芦规模化脱水作业前粉碎预处理方案中试比选·····	杜静, 钱玉婷, 靳红梅, 徐跃定, 黄红英, 常志州 (266)
木质纤维素酸催化制备糠醛的工艺及机理研究进展 ·····	王琼, 王闻, 亓伟, 余强, 谭雪松, 庄新姝, 袁振宏, 王忠铭 (272)

• 土地整理工程 •

环京津贫困带土地利用多功能性的县域尺度时空分异及影响因素 ·····	孙丕苓, 许月卿, 刘庆果, 刘超, 黄安 (283)
---------------------------------------	-----------------------------

• 农产品加工工程 •

苜蓿气体射流冲击联合常温通风干燥装备设计及试验 ·····	于贤龙, 高振江, 代建武, 薛令阳, 王栋, 王军, 邓利珍, 谢永康, 张晓琳, 肖红伟 (293)
开放式太阳能物料干燥热湿迁移模型的构建及验证·····	郝文刚, 陆一锋, 赖艳华, 张宗敏, 吕明新 (301)
适宜无机盐及浓度抑制麦胚脂肪酶存在时油水界面张力 ·····	陈中伟, 孙俊, 王力坤, 吴其飞, 徐斌 (308)

Transactions
of the Chinese Society of Agricultural Engineering
Vol.33 No.15 Aug. 2017
CONTENTS

• Comprehensive Research • Key Technology •

Yield and physical characteristics analysis of domestic waste in rural areas of China and its disposal proposal

..... *Han Zhiyong, Fei Yongqiang, Liu Dan, Dan Zeng, Zhang Yu, Shi Guozhong, Wang Jialei, Xie Yanhua* (1)

• Agricultural Equipment Engineering and Mechanization •

Design and test of rice potted-seedling transplanting mechanism with three transplanting arms

..... *Wu Guohuan, Yu Gaohong, Xiang Xiaojie, Wang Linwei* (15)

Development of 2ZXM-2 automatic plastic film mulching plug seedling transplanter for vegetable

..... *Li Hua, Cao Weibin, Li Shufeng, Liu Jiaodi, Chen Bangbang, Ma Xiaoxiao* (23)

Optimal design and experiment of hybrid-driven five-bar flower potted-seedling transplanting mechanism

..... *Zhao Xiong, Cui Haiyang, Dai Li, Xu Yadan, Wang Chuan, Shen Jin* (34)

Effects of axial flow and tangential flow mechanical threshing on rice damage and milling quality

..... *Li Yinian, Chen Junsheng, Ding Qishuo, Ding Weimin* (41)

Air pressure stabilizing method and experiment of pneumatic seed-metering system of precision rapeseed planter

..... *Liao Yitao, Shu Caixia, Liao Qingxi, Wei Yuepei, Wang Lei, Wang Du, Zheng Juan* (49)

Effect of planosol improvement by using straw subsoil mixed layer plough

..... *Zhu Baoguo, Zhang Chunfeng, Jia Huibin, Wang Nannan, Meng Qingying,
Kuang Enjun, Wang Qiuju, Gao Zhongchao, Liu Feng, Zhang Libo, Gao Xuedong* (57)

Design and experiment of pesticide droplet deposition detection system based on principle of standing wave ratio

..... *Wu Yalei, Qi Lijun, Zhang Ya, Gao Chunhua, Li Shuai, Elizabeth Musiu* (64)

Aerodynamics modeling and validation on liquid medicine spraying of target weeding robot

..... *Quan Longzhe, Wang Jiansen, Xi Dejun, Li Yajun, Sun Wenfeng, Chen Ci* (72)

Influence of deflector angles for orchard air-assisted sprayer on 3D airflow distribution

..... *Lü Xiaolan, Zhang Meina, Chang Youhong, Lei Xiaohui, Yang Qingsong* (81)

Spray target detection based on laser scanning sensor and real-time correction of IMU attitude angle

..... *Liu Hui, Li Ning, Shen Yue, Xu Hui* (88)

Numerical simulation and validation of effects of blade inlet angle on performance of pump-as-turbine

..... *Wang Tao, Kong Fanyu, Liu Yingying, Wei Qineng* (98)

• **Agricultural Aviation Engineering** •

Development and experiment of enhancement precipitation unmanned aerial vehicle adapted to weather and topography of plateau

..... *Ma Xueqian, Sun Anping, Zhang Xiaojun, Han Huibang* (105)

• **Soil and Water Engineering** •

Development of real-time and automatic measuring equipment for runoff and sediment

..... *Zhan Xiaoyun, Guo Minghang, Zhao Jun, Zhao Xianghui* (112)

Experiment on influence of cover degree, slope and rainfall intensity on sediment concentration of slope runoff in rangeland

..... *Wang Dongdong, Wang Zhanli, Zhang Qingwei, Zhang Qilin, Tian Naling* (119)

Changes of matric suction in expansive soil under drying-wetting cycles using filter paper method

..... *Wu Junhua, Yang Song* (126)

Effect of wind-sand erosion on frost resistance durability of hydraulic engineering concrete in cold irrigation area

..... *Xue Huijun, Shen Xiangdong, Liu Qian, Wang Renyuan, Liu Zheng, Han Chao* (133)

Experiment on strength and permeability of recycled aggregate pervious concrete

..... *Chen Shoukai, Yang Qing, Liu Qiuchang, Guo Lei, Wang Lunyan* (141)

Erosion resistance effects and mechanism of hedgerows in slope of engineering accumulation

..... *Yang Shuai, Gao Zhaoliang, Li Yonghong, Niu Yaobin, Wang Kai, Bai Hao, Qi Xingyuan, Li Yutingting* (147)

Slope instability evaluation method using finite element method of strength reduction and displacement rate

..... *Jiang Shenghua, Wang Shiji, Li Weiqing, Bao Anhong* (155)

Improvement of soil surface roughness measurement accuracy by close-range photogrammetry

..... *Tao Haoran, Chen Quan, Li Zhen, Zeng Jiangyuan, Chen Xiaoning* (162)

Improving of soil physical and chemical properties and increasing spring maize yield by straw turnover plus nitrogen fertilizer

..... *Bai Wei, An Jingwen, Zhang Lizhen, Pang Huancheng, Sun Zhanxiang, Niu Shiwei, Cai Qian* (168)

Design of trapezoidal cut-throated flume and its hydraulic performance simulation and test

..... *Ran Danjie, Wang Wen'e, Hu Xiaotao* (177)

Improving effect of hydraulic characteristics of nature-like fishway with pools and cobblestone weirs

..... *Li Guangning, Sun Shuangke, Liu Haitao, Zhang Chao, Zhao Guixia, Zheng Tiegang* (184)

Analysis of spatio-temporal distribution of drought characteristics based on SPEI in Inner Mongolia during 1960-2015

..... *Zhang Xuting, Pan Xuebiao, Xu Lin, Wei Pei, Yin Ziwei, Shao Changxiu* (190)

• Agricultural Information and Electrical Technologies •

Ningxia rice area remote sensing estimation on large scale based on multi-temporal OLI data

..... *Liu Jia, Wang Limin, Yao Baomin, Yang Fugang, Yang Lingbo, Wang Xiaolong, Cao Huaitang* (200)

Natural mowing grassland resource distribution and biomass estimation based on remote sensing in Hulunber

..... *Yan Ruirui, Tang Huan, Ding Lei, Yao Jing, Chen Baorui, Xin Xiaoping, Wang Xu, Yan Xiaohong, Niu Wenyan* (210)

Classification and recognition approaches of tomato main organs based on DCNN

..... *Zhou Yuncheng, Xu Tongyu, Zheng Wei, Deng Hanbing* (219)

Information integration management system for spiral bevel gear networked manufacturing process

..... *Li Jubo, Gao Zhenshan, Li Tianxing, Yang Jianjun, Xu Aijun, Wang Bin* (227)

• Agricultural Bioenvironmental and Energy Engineering •

Design and implementation on real-time monitoring system of laying hens environmental comfort based on LabVIEW

..... *Bai Shibao, Teng Guanghui, Du Xiaodong, Du Xinyi* (237)

Thermal performance experiment for multiple clamber trough solar air collector with dual collector tubes for solar greenhouse

..... *Chen Chao, Zhang Mingxing, Zheng Hongfei, Li Na, Ma Xinglong, Ling Haoshu, Ma Caiwen, Zou Ping* (245)

Performance of substrate blocks glued by modified urea formaldehyde resins and its effect on cucumber seedlings

..... *Qu Ping, Zhao Yongfu, Song Jing, Xia Liru* (253)

Analysis on xanthan gum solution to simulate flow performance of digestion sludge

..... *Cao Xiuqin, Yuan Haiguang, Zhao Zhendong, Ding Hao* (260)

Comparison and selection of smash pretreatment scheme before dehydration in large scale for water hyacinth

..... *Du Jing, Qian Yuting, Jin Hongmei, Xu Yueding, Huang Hongying, Chang Zhizhou* (266)

Progress on technologies and mechanism of furfural production from lignocellulose catalyzed by acids

..... *Wang Qiong, Wang Wen, Qi Wei, Yu Qiang, Tan Xuesong, Zhuang Xinshu, Yuan Zhenhong, Wang Zhongming* (272)

• Land Consolidation and Rehabilitation Engineering •

Spatiotemporal differentiation and driving factors of multi-functionality of land use in county scale in poverty belt around Beijing and Tianjin

..... *Sun Piling, Xu Yueqing, Liu Qingguo, Liu Chao, Huang An* (283)

• **Agricultural Produce Processing Engineering** •

Design and experiment of air-impingement jet combined with normal temperature ventilation dryer for alfalfa

..... *Yu Xianlong, Gao Zhenjiang, Dai Jianwu, Xue Lingyang, Wang Dong, Wang Jun, Deng Lizhen,
Xie Yongkang, Zhang Xiaolin, Xiao Hongwei* (293)

Modeling of materials heat and moisture transfer in open sun drying and experimental validation

..... *Hao Wengang, Lu Yifeng, Lai Yanhua, Zhang Zongmin, Lü Mingxin* (301)

Suitable inorganic salt and its content inhibiting tension of oil-water interface with wheat germ lipase

..... *Chen Zhongwei, Sun Jun, Wang Likun, Wu Qifei, Xu Bin* (308)