



2017年第22期总84期

## 蔬菜育种专题

### 本期导读

#### ▶ 前沿资讯

1. 当植物竞争时，更多的基因被激活

#### ▶ 学术文献

1. 温室和田间试验与冬油菜品种对根肿和抵抗力
2. 基因表达的基因组范围的分析，和区分在十字花科上光周期依赖性和非依赖性开花
3. 叶片蜡质含量和组成变化的发育和基因型，并且在甘蓝蜡的生物合成基因的表达
4. 热空气和冷冻干燥对白菜物理特性和挥发物形态的比较评价

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2017年05月29日

## ➤ 前沿资讯

### 1. More genes turned on when plants compete (当植物竞争时, 更多的基因被激活)

简介: Some people travel to northern California for wine. However, one plant biologist treks to the Golden State for clover. The lessons of plant diversity and competition learned from a clover patch can potentially unlock secrets on plant interactions around the globe.

来源: Science Daily

发布日期: 2017-05-15

全文链接:

<https://www.sciencedaily.com/releases/2017/05/170515122147.htm>

## ➤ 学术文献

### 1. Greenhouse and field experiments with winter oilseed rape cultivars resistant to *Plasmodiophora brassicae* Wor. (温室和田间试验与冬油菜品种对根肿和抵抗力)

简介: Clubroot disease, caused by *Plasmodiophora brassicae* (Wor.), has been affecting on winter oilseed rape (*Brassica napus* L.) in the Czech Republic over the past 4 years. Therefore, research on *P. brassicae* in the Czech Republic is important for developing effective strategies to manage clubroot under Czech environmental conditions. Experiments with *P. brassicae*-resistant cultivars of winter oilseed rape were conducted in an infested field and greenhouse. In the greenhouse, six resistant cultivars were grown in the infested soil collected from various fields in the Czech Republic and were assessed for index of disease (ID %). The best results achieved by cultivar Mentor ( $2 \pm 0.7\%$ ) closely followed by cultivar SY Alister ( $5 \pm 1.1\%$ ), the worst one was cultivar CHW 241 ( $30 \pm 3.8\%$ ). In the field experiments seven resistant cultivars were grown, and disease development was monitored monthly. The lowest index of disease brought cultivar Andromeda ( $3 \pm 0.8\%$ ) and PT 235 ( $4 \pm 1.5\%$ ), the highest ID has cultivar CWH 241 ( $46 \pm 6.5\%$ ) in the first season and in the second season any cultivar achieved 25% ID. Yields were measured at the end of the cropping season. The highest yield was achieved by cultivar SY Alister (6.1 t/ha) in the first season and cultivar PT 242 (5.03 t/ha) in the second season. The inoculum level was measured across the field by (qPCR), and an infestation map was created. The highest spore concentration was found on the field entrance. Collectively, the information obtained on the effectiveness of host resistance and pathogenic diversity of *P. brassicae* populations from the Czech Republic may help to more effectively manage clubroot in this country.

来源: Crop Protection

发布日期: 2017-02

全文链接:

<http://agri.ckcest.cn/ass/NK002-20170529003.pdf>

## 2 . Genome-wide analysis of gene expression to distinguish photoperiod- dependent and - independent flowering in Brassicaceae (基因表达的基因组范围的分析, 和区分在十字花科上光周期依赖性和非依赖性开花)

简介: Photoperiod is the most important environmental cue for the regulation of flowering time, a highly important agronomic trait for crop productivity. To help elucidate the photoperiodic control of flowering in Brassicaceae, we performed microarray experiments using species-specific oligoarrays with the long day (LD) plant *Arabidopsis thaliana* and the photoperiod-independent plant rapid cycling *Brassica rapa* (RCBr). Enrichment analysis of the gene ontologies of differentially expressed genes (DEGs) did not uncover clear differences in gene expression between photoperiod-dependent and -independent plants. Most genes that were upregulated under LD conditions in *Arabidopsis* were also upregulated in RCBr. In addition, most genes associated with light signaling and the circadian clock showed similar expression patterns between *Arabidopsis* and RCBr, implying that most components known to be key regulators in the photoperiodic flowering pathway are not responsible for the photoperiod independence of RCBr. Nonetheless, we identified one clock-associated gene, PSEUDO-RESPONSE REGULATOR9 (PRR9), as a candidate gene explaining the photoperiod independence of RCBr. The mechanism underlying the role of PRR9 in photoperiodic control and genomic polymorphisms should be further explored using different *B. rapa* species.

来源: Genes & Genomics

发布日期: 2017-02

全文链接:

<http://agri.ckcest.cn/ass/NK002-20170529004.pdf>

## 3. Developmental and Genotypic Variation in Leaf Wax Content and Composition, and in Expression of Wax Biosynthetic Genes in *Brassica oleracea* var. *capitata* (叶片蜡质含量和组成变化的发育和基因型, 并且在甘蓝蜡的生物合成基因的表达)

简介: Cuticular waxes act as a protective barrier against environmental stresses. In the present study, we investigated developmental and genotypic variation in wax formation of cabbage lines, with a view to understand the related morphology, genetics and biochemistry. Our studies revealed that the relative expression levels of wax biosynthetic genes in the first-formed leaf of the highest-wax line remained constantly higher but were decreased in other genotypes with leaf aging. Similarly, the expression of most of the tested genes exhibited decrease from the inner leaves to the outer leaves of 5-month-old cabbage heads in the low-wax lines in contrast to the highest-wax line. In 10-week-old plants, expression of wax biosynthetic genes followed a quadratic function and was generally increased in the early developing leaves but substantially decreased at the older leaves. The waxy compounds in all cabbage lines were predominately C29- alkane, -secondary alcohol, and -ketone. Its deposition was increased with leaf age in 5-month-old plants. The high-wax lines had dense, prominent and larger crystals on the leaf surface compared to low-wax lines under scanning

electron microscopy. Principal component analysis revealed that the higher expression of LTP2 genes in the lowest-wax line and the higher expression of CER3 gene in the highest-wax line were probably associated with the comparatively lower and higher wax content in those two lines, respectively. This study furthers our understanding of the relationships between the expression of wax biosynthetic genes and the wax deposition in cabbage lines.

来源: Frontiers in Plant Science

发布日期: 2017-01-09

全文链接:

<http://agri.ckcest.cn/ass/NK002-20170529002.pdf>

#### **4. Comparative evaluation of physical properties and volatiles profile of cabbages subjected to hot air and freeze drying (热空气和冷冻干燥对白菜物理特性和挥发物形态的比较评价)**

简介: The aim of the present study was to evaluate the physical parameters, volatiles profile and sensory quality of the cabbage pieces subjected to hot air drying and freeze drying processes. Physical properties such as water activity, shrinkage, hardness, springiness, cohesiveness, chewiness, rehydration ratio and color measurements were measured using standard procedures while the volatile compounds were determined by the SPME-GC-MS method. The results showed that convective drying of cabbages lead to major adverse changes in physical and volatile compounds characteristics. Hot air and freeze drying of cabbages display different volatiles profile containing aldehydes, alcohols, terpenes, ketones and furans. Better retention of character impact cabbage green and pungent aroma compounds viz. allyl isothiocyanate, dimethyl sulfide, dimethyl disulfide, 1-octen-3-ol and (Z)-2-penten-1-ol was found in freeze dried cabbage. The presence of 3-(methylthio)-propyl isothiocyanate, methyl benzene isothiocyanate and phenyl ethyl isothiocyanate is reported here for the first time in fresh cabbages. The flavor components of fresh cabbage were largely retained in the freeze dried product. Freeze drying also leads to positive sensory effects and better overall acceptability by consumers compared to the hot air dried product.

来源: LWT-Food Science and Technology

发布日期: 2017-03-22

全文链接:

<http://agri.ckcest.cn/ass/NK002-20170529001.pdf>