

## 葡萄砧木新品种‘郑寒1号’的选育

魏志峰<sup>1</sup>,高登涛<sup>1</sup>,刘丽<sup>1\*</sup>,郭景南<sup>1</sup>,樊秀彩<sup>1</sup>,孙海生<sup>1</sup>,姜建福<sup>1</sup>,  
李秋利<sup>1</sup>,艾建东<sup>2</sup>,房荣年<sup>3</sup>,柳玉霞<sup>3</sup>,王纪梅<sup>3</sup>

<sup>1</sup>中国农业科学院郑州果树研究所,郑州 450009; <sup>2</sup>河南省宏力高科技农业发展有限公司,河南新乡 453000;  
<sup>3</sup>北京市延庆区园林管理中心,北京 102100

**摘要:**‘郑寒1号’是以‘河岸580’为母本、山葡萄为父本杂交选育出的葡萄抗寒砧木新品种,耐盐碱,适应性广、产条量多,与生产上常用品种嫁接亲和性良好。与生产上常用抗寒砧木‘贝达’相比,对‘夏黑’‘户太8号’‘阳光玫瑰’等接穗品种的主要果实经济性状无明显影响。不同的低温冷冻后,通过对枝条的相对电导率及恢复生长法测定,‘郑寒1号’半致死温度为-30.78℃,‘贝达’为-28.88℃,‘郑寒1号’抗寒性强于‘贝达’;且低温处理后‘郑寒1号’枝条萌芽率也高于‘贝达’。经测定,水培条件下,‘郑寒1号’能忍耐0.3%NaCl+18%的饱和石灰水,而‘贝达’只能忍耐0.2%NaCl+15%的饱和石灰水。在郑州地区,4月上旬开始萌芽,5月上旬开花,7月上旬枝条开始老化,11月上旬开始落叶,全年生育期约216 d。

**关键词:**葡萄;新品种;‘郑寒1号’;砧木

中图分类号:S663.1

文献标志码:A

文章编号:1009-9980(2019)09-1248-04

## Breeding of a new grape rootstock cultivar ‘Zhenghan No. 1’

WEI Zhifeng<sup>1</sup>, GAO Dengtao<sup>1</sup>, LIU Li<sup>1\*</sup>, GUO Jingnan<sup>1</sup>, FAN Xiucui<sup>1</sup>, SUN Haisheng<sup>1</sup>, JIANG Jianfu<sup>1</sup>,  
LI Qiuli<sup>1</sup>, AI Jiandong<sup>2</sup>, FANG Rongnian<sup>3</sup>, LIU Yuxia<sup>3</sup>, WANG Jimei<sup>3</sup>

(<sup>1</sup>Zhengzhou Fruit Research Institute, Chinese Academy of Agricultural Sciences, Zhengzhou 450009, Henan, China; <sup>2</sup>Henan Hongli High-tech Agricultural Development Co., Ltd., Xinxiang 453000, Henan, China; <sup>3</sup>Beijing Yanqing District Garden Management Center, Beijing 102100, China)

**Abstract:** ‘Zhenghan No.1’ was newly selected from hybrids of the cross between ‘Hean 580’ (female parent) and Shan putao (male parent) in 2008, 432 hybrid seeds were harvested in autumn. In March 2009, 156 hybrid seedlings were obtained by sowing hybrid seeds through sand accumulation treatment. Through selection and elimination, 120 hybrid seedlings were preserved until 2011. In 2012, 46-8-4 showed the characteristics of high cold resistance and salt-alkali resistance, and was designated as a superior cold-resistant rootstock line. In 2013, regional test sites were established in Weishi county in Kaifeng, Changyuan county in Xinxiang, Mengzhou county in Jiaozuo and Yanqing county in Beijing, and main varieties such as Sunshine Rose, Xiahei Seedless and Hutai No.8 were grafted. Regional test showed good grafting compatibility. The cultivar is high resistant to salinity tolerance, wide adaptability and high yield. It has good grafting affinity with common varieties in production. ‘Zhenghan No. 1’ has strong growth potential, strong branch growth, few bad branches, good maturity of branches, and can yield 10 250 meters per mu. The relative conductivity and recovery growth of branches were measured after freezing at different temperatures. The semi-lethal temperature of ‘Zhenghan No. 1’ was -30.78℃, ‘Beida’ was -28.88℃, ‘Zhenghan No. 1’ had higher cold resistance than ‘Beida’, and the germination rate of ‘Zhenghan 1’ was also higher than ‘Beida’. In spring, 18 rootstocks of one-year-old ‘Kangzhen No. 3’ ‘Kangzhen No. 1’ ‘HuajiaNo.8’ ‘DogRidge’ ‘Saltreek’ ‘Cloire’ ‘Beida’

收稿日期:2019-06-05

接受日期:2019-08-26

基金项目:河南省科技攻关计划项目(182102110217);中央级科研院所基本科研业务专项(020119)

作者简介:魏志峰,男,助理研究员,研究方向果树栽培生理。Tel:13939005750, E-mail:weizhifeng@caas.cn

\*通信作者 Author for correspondence. Tel:13526652449, E-mail:liuli03@caas.cn

‘SO4’‘3309C’‘1103’‘5BB’‘SandyGrape’‘5C’‘775P’‘110R’‘420A’‘Zhenghan No. 2’‘Zhenghan No. 1’ were cut into branches. Cuttings with 3-5 buds were cultured in laboratory. After the cuttings had grown a small number of roots, they were cultured with 1/10 Hoagland nutrient solution until the branches had grown a large number of roots. Treated with different concentrations of NaCl and saturated lime water. The results showed that ‘Zhenghan No. 1’ could tolerate 0.3% NaCl + 18% saturated lime water under hydroponic conditions, while Beida could only tolerate 0.2% NaCl + 15% saturated lime water. Compared with the commonly used cold-resistant rootstock ‘Beida’, there was no obvious effect on the economic characters of the scion varieties such as ‘Summer Black seedless’ ‘Hutai No.8’ and ‘Sunshine rose’. The survival rate of ‘Zhenghan No. 1’ grafted with ‘Summer Black Seedless’ and ‘Hutai No. 8’ was 90.0% and 86.6%, respectively; the yield of ‘Sunshine Rose’ grafted with ‘Zhenghan No. 1’ could reach 646 kg in the second year and 2 132 kg in the third year. It can be seen that ‘Zhenghan No. 1’ had good affinity with the main varieties ‘Summer Black seedless’ ‘Hutai No. 8’ and ‘Sunshine Rose’. It began to germinate in early April, blossom in early May, branch began to aging in early July, leaves began to fall in early November, and the whole year’s growth period was about 216 days in Zhengzhou. ‘Zhenghan No. 1’ had no leaf and branch diseases throughout the year, and no chemical control was needed. ‘Zhenghan No. 1’ showed good plantability in different producing areas. It could grow normally in the areas such as Changyuan with low temperature in winter and Boai with cloyed ground.

**Key words:** Grape; New cultivar; ‘Zhenghan No. 1’; Rootstock

葡萄是我国栽培的主要果树树种之一,但部分葡萄品种抗寒能力差,欧亚种葡萄在多年极端最低温年均值低于 $-15^{\circ}\text{C}$ 的地区必须埋土防寒,而欧美杂种在低于 $-17^{\circ}\text{C}$ 的地区也要埋土防寒<sup>[1]</sup>。葡萄抗寒性因种类、品种、器官、组织及生育期不同而表现出极大差异,其中休眠期根系抗寒力最差,一般在土温降到 $-4^{\circ}\text{C}\sim-5^{\circ}\text{C}$ 即受冻害胁迫<sup>[1]</sup>,根系冻害是寒地葡萄发展的主要限制因子。葡萄优良砧木抗寒性极强,根系能耐 $-36^{\circ}\text{C}\sim-12^{\circ}\text{C}$ 的低温<sup>[2]</sup>。利用抗寒砧木嫁接栽培,可以提高葡萄冬季抗寒能力、减少埋土、降低生产成本,还可以提高产量、改善果实品质<sup>[3]</sup>。

近年来,极端低温天气时有发生,嫁接栽培作为目前经济有效的防治措施,逐渐得到人们的重视,并将成为葡萄生产的主要栽培方式之一。由于我国葡萄育种一直偏重于鲜食葡萄品种<sup>[4-5]</sup>,砧木育种一直未得到重视,致使葡萄砧木多为国外引进品种,缺乏拥有自主知识产权的抗寒砧木品种。

## 1 选育过程

2008年,以‘河岸580’为母本、‘山葡萄’为父本配置杂交组合,当年秋季获杂交种子432粒,经沙藏层积处理,于2009年3月播种杂交种子,获杂种实生苗156株,经选种淘汰,至2011年保存有杂种苗120株。2012年,通过抗寒性及抗盐碱鉴定,46-8-4表现

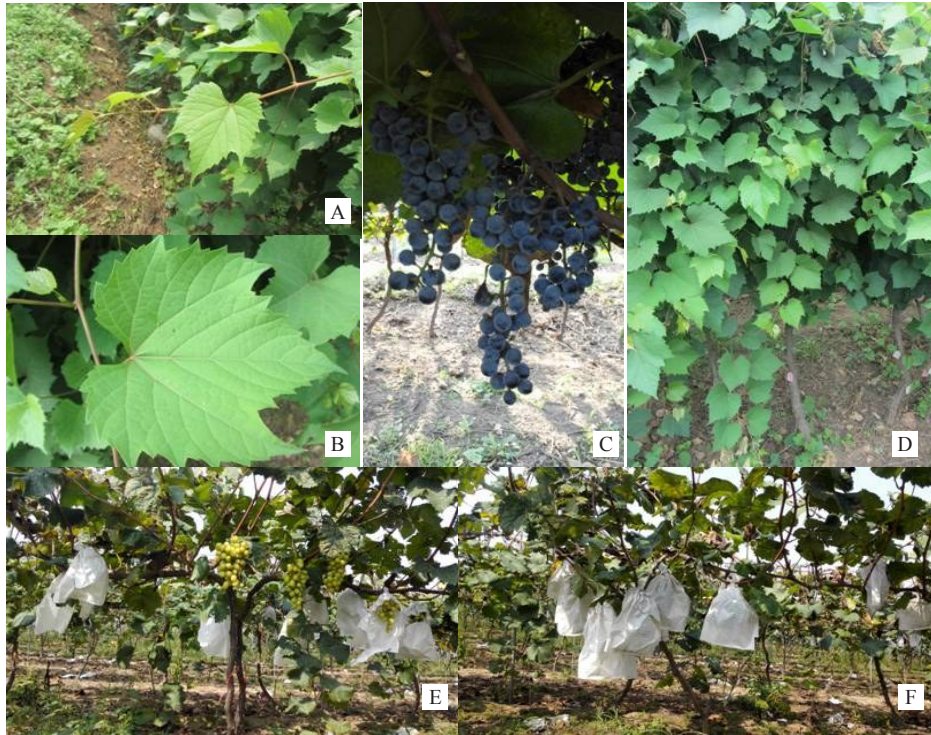
出高抗寒、抗盐碱的特性,被定为抗寒砧木优系,至此该品种的选育鉴定工作结束。

2013年,开始在河南开封尉氏县、新乡长垣县、焦作孟州市及北京延庆县建立区域试验点,嫁接‘阳光玫瑰’‘夏黑无核’‘户太8号’等主栽品种,进行区域试验,嫁接亲和性表现良好,2015年通过河南省林木品种审定委员会审定,并定名为‘郑寒1号’(良种编号:豫S-SV-VV-016-2015)(图1)。

## 2 主要性状

### 2.1 植物学性状

‘郑寒1号’植株生长势强,产条量多,副梢萌芽力强,隐芽萌发力强,枝条成熟度好。嫩梢黄绿色带红晕,梢尖有光泽。幼叶上表面光滑,带光泽。成龄叶片楔形,绿色,泡状突起弱,下表面主脉上有密直立茸毛。叶片3裂。锯齿两侧直。叶柄洼开张,U形,不受叶脉限制。叶柄中等长(10.0 cm),浅棕红色。新梢生长半直立,无茸毛;卷须中等长(25.0 cm),2分叉。节间背侧淡绿色,腹侧浅红色。冬芽黄褐色,中等着色程度。枝条横截面呈近圆形,枝条表面光滑,枝条红褐色。枝条节间长13.6 cm,粗1.0 cm。枝条红褐色。两性花。‘郑寒1号’在郑州地区,正常年份4月上旬开始萌芽,5月上旬开花,花期5~7 d。7月上旬枝条开始老化,11月上旬开始落叶,全年



A. 郑寒 1 号新梢; B. 郑寒 1 号成龄叶片; C. 郑寒 1 号果实; D. 郑寒 1 号母株; E. 郑寒 1 号嫁接阳光玫瑰结果状; F. 阳光玫瑰自根砧结果状。

A. New Shoots of Zhenghan No.1; B. Mature leaves of Zhenghan No.1; C. Fruits of Zhenghan No.1; D. Ancestral trees of Zhenghan No.1; E. Zhenghan No. 1 grafted with Sunshine Rose fruiting; F. Fruiting form of self-rooted rootstock of Sunshine Rose.

图 1 ‘郑寒 1 号’主要形态特征及嫁接表现

Fig. 1 Main morphological characteristics and grafting performance of ‘Zhenghan No.1’

生育期 216 d 左右。

## 2.2 与‘贝达’主要性状的对比

2.2.1 耐寒性的对比 将供试 1 a 生的‘郑寒 1 号’‘郑寒 2 号’‘贝达’枝条用蒸馏水冲洗干净, 每个品种平均分成 7 份, 每份 30 段, 装入干净的塑料袋中, 其中 1 份作为对照(4℃), 其余 6 份放入低温冰箱(温度误差±1℃)进行分批低温处理。低温处理温度分别为-10、-15、-20、-25、-30、-35℃。以 0℃为起点, 4℃·h<sup>-1</sup>的速率降温, 到达设定温度后保持 24 h, 之后逐步升温至 4℃, 取出置于 4℃下保持 12 h, 然后进行相对电导率及恢复生长法的相关测定。不同低温冷冻后, 通过对枝条的相对电导率及恢复生长法测定, ‘郑寒 1 号’半致死温度为-30.78℃, ‘贝达’

为-28.88℃(表 1), 可见, ‘郑寒 1 号’抗寒性高于‘贝达’; 恢复生长法结果显示且低温处理后‘郑寒 1 号’枝条萌芽率也高于‘贝达’(表 2)。

2.2.2 耐盐碱性的对比 春季分别将 1 a 生‘抗砧 3 号’‘抗砧 5 号’‘华佳 8 号’‘Dog Ridge’‘Salt Creek’‘Cloire’‘贝达’‘SO4’‘3309C’‘1103’‘5BB’‘沙地葡萄’‘5C’‘775P’‘110R’‘420A’‘郑寒 2 号’‘郑寒 1 号’共计 18 个砧木品种的枝条, 剪成有 3~5 个芽的插条, 置于实验室培养。待插条长出少量根系后, 用含 1/10 Hoagland 营养液继续培养至枝条长出大量根系。进行如下处理: 对照: 清水; T1: 0.1% NaCl+10% 的饱和石灰水; T2: 0.2% NaCl+15% 的饱和石灰水; T3: 0.3% NaCl+18% 的饱和石灰水; T4:

表 1 不同葡萄砧木品种相对电导率 Logistic 方程和低温半致死温度

Table 1 Logistic equation of relative conductivity and low temperature semi-lethal temperature of different grape rootstocks

品种 Cultivar	回归方程 Logistic equation	相关系数( <i>r</i> ) Correlation coefficient ( <i>r</i> )	半致死温度 Semi-lethal temperature/℃
郑寒 1 号 Zhenghan No.1	$Y=1/(1+4.233 \times 1.048^x)$	0.970**	-30.78
贝达 Beida	$Y=1/(1+5.839 \times 1.063^x)$	0.994**	-28.88
郑寒 2 号 Zhenghan No.2	$Y=1/(1+5.317 \times 1.071^x)$	0.933**	-24.70

注: 表中\*\*表示在  $\alpha = 0.01$  水平显著。

Note: In the table, \*\* means significant at the level of  $\alpha = 0.01$ .

表2 不同低温处理后葡萄砧木品种枝条萌芽率

Table 2 Branch germination rate of Grape rootstock varieties after different low temperature treatment

%

品种 Cultivar	4 °C	-10 °C	-15 °C	-20 °C	-25 °C	-30 °C	-35 °C
郑寒1号 Zhenghan No.1	100.00 a	98.89 a	95.56 a	82.22 a	63.33 a	37.78 a	5.56 a
贝达 Beida	100.00 a	98.89 a	91.11 b	81.11 a	58.89 b	32.22 b	4.44 a
郑寒2号 Zhenghan No.2	100.00 a	87.78 b	84.44 c	70.00 b	32.22 c	14.44 c	0.00 b

注:表中数字后小写字母表示在 0.05 水平差异显著性。

Note: The lowercase letters after the numbers in the table show significant difference at the level of 0.05.

0.4%NaCl+20%的饱和石灰水;T5:0.5%NaCl+22%的饱和石灰水;观察记录砧木的盐碱害。经测定,水培条件下,‘郑寒1号’能忍耐0.3%NaCl+18%的饱和石灰水,而‘贝达’只能忍耐0.2%NaCl+15%的饱和石灰水。

2.2.3 嫁接亲和性的对比 ‘郑寒1号’分别嫁接‘夏黑’与‘户太8号’的成活率为90.0%、86.6%;‘贝达’嫁接两个品种的成活率为83.3%、86.6%,‘郑寒1号’的成活率略高于‘贝达’;‘郑寒1号’嫁接‘阳光玫瑰’第2年产量可达646 kg,第3年可达2 132 kg,可见‘郑寒1号’与主栽品种‘夏黑’‘户太8号’‘阳光玫瑰’均嫁接亲和性好。

2.2.4 产条量的对比 ‘郑寒1号’生长势极强,枝条顺直光滑,不良分枝少,成熟度高,产条量(单位面积符合扦插要求的枝条总长度)每666.7 m<sup>2</sup>可达10 250 m,‘贝达’为每666.7 m<sup>2</sup> 9 450 m,‘郑寒1号’产条量显著高于‘贝达’。

2.2.5 其他性状表现 在病害方面,‘郑寒1号’全年无叶部和枝条病害发生,无需药剂防治。‘郑寒1号’在不同产区均表现出良好的适栽性,在冬天气温较低的长垣、博爱的偏黏土地上均能正常生长,表现出极强的栽培适应性。

### 3 栽培技术要点

#### 3.1 种植密度

‘郑寒1号’抗病性极强,生长势旺盛。在瘠薄地建产条园时,可采用1.5 m×2.5 m的株行距;在肥沃良田建产条园时,可采用2.0 m×3.0 m的株行距。

#### 3.2 栽培架式

砧木品种不以追求果实经济产量为目的,主要为获得高产、优质的枝条,架式宜采用单臂篱架,头状树形。

#### 3.3 树形培养和修剪

树形培养:定植当年当新梢长到20 cm左右时,可选留粗壮新梢1个,其余嫩梢抹除。为促进副梢及便于整形,待新梢生长到架面高度时摘心,摘心后

保留所有副梢任其生长。冬季主蔓上所有的枝条全部留3个芽短截。至此树形培养结束。

树形管理:春季萌发的新梢要全部保留,整个任其生长,以尽量多的增加产条量,冬季只在主蔓上选择10个左右1 a生枝条留3芽短截,其他枝条全部打下,生产种条。

#### 3.4 肥水管理

‘郑寒1号’属于高生长量葡萄砧木品种,生长季可不进行追肥,但为增加产条量和枝条成熟度,应在每年10月施一次基肥(每666.7 m<sup>2</sup>施3 000 kg有机肥)。

#### 3.5 枝条采收

为增加枝条成熟度,枝条应在叶片自然脱落后1个月左右进行采收。

#### 参考文献 References:

- [1] 孔庆山. 中国葡萄志 [M]. 北京:中国农业科学技术出版社, 2004:93-124.  
KONG Qingshan. Chinese ampelography[M]. Beijing: China Agricultural Scientific and Technical Press, 2004: 93-124.
- [2] 王丽雪,李荣富,张福仁. 葡萄枝条中蛋白质、过氧化物酶活性变化与抗寒性的关系[J]. 内蒙古农牧学院学报, 1996, 17(1):45-50.  
WANG Lixue, LI Rongfu, ZHANG Furen. Changes of total protein and peroxidase activity in grape shoots, and their relationships to cold resistance[J]. Journal of Inner Mongolia Institute of Agriculture & Animal Husbandry, 1996, 17(1):45-50.
- [3] 钟海霞,艾尔买克·才卡斯木,张付春,潘明启,韩守安,张雯,谢辉,陈锐,伍新宇. 7个葡萄砧木根系的抗寒性研究[J]. 新疆农业科学, 2016, 53(3):429-436.  
ZHONG Haixia, Aiermaike·Caikasimu, ZHANG Fuchun, PAN Mingqi, HAN Shouan, ZHANG Wen, XIE Hui, CHEN Rui, WU Xinyu. Study on cold resistance of roots of 7 grape rootstocks[J]. Xinjiang Agricultural Sciences, 2016, 53(3):429-436.
- [4] 郭修武,李成祥,郭印山,李铁辉,高秀岩,周兴本,李坤. 大粒抗病葡萄新品种‘沈农硕丰’[J]. 园艺学报, 2010, 37(11):1873-1874.  
GUO Xiuyu, LI Chengxiang, GUO Yinshan, LI Yihui, GAO Xiuyan, ZHOU Xingben, LI Kun. A new grape cultivar ‘Shennong Shuofeng’ with big berry and disease resistance [J]. Acta Horticulturae Sinica, 2010, 37(11):1873-1874.
- [5] 马小河,唐晓萍,陈俊,赵旗峰,董志刚. 优质中熟葡萄新品种‘秋黑宝’[J]. 园艺学报, 2010, 37(11):1875-1876.  
MA Xiaohu, TANG Xiaoping, CHEN Jun, ZHAO Qifeng, DONG Zhigang. A new excellent mid-maturing grape cultivar ‘Qiuheibao’ [J]. Acta Horticulturae Sinica, 2010, 37(11):1875-1876.