作物学报 2005 31 (12): 1537-1543 ISSN: 0496-3490 CN: 11-1809/S

研究论文

大麦杂种优势利用研究,III.大麦异棱型和同棱型F1杂种的杂种优势特征

许如根，吕超，缪丽霞，莫惠栋

江苏省作物遗传生理重点实验室，江苏扬州225009

收稿日期 2004-10-14 修回日期 2005-4-20 网络版发布日期 接受日期

摘要 研究了大麦4种杂交类型（含二棱×二棱、二棱×六棱、六棱×二棱和六棱×六棱）的F1杂种的性状表现和优势特征，比较了同棱型相配组（二棱×二棱和六棱×六棱）和异棱型相配组（二棱×六棱和六棱×二棱）的超高亲优势（Hh）组合数及其出现率。研究性状包括株高、穗长、穗下节间长、穗数、粒数、粒重、籽粒产量、籽粒蛋白质含量和赖氨酸含量等13个。结果表明，(1)二棱×二棱杂种的穗长较长、每株穗数较多、千粒重较高；六棱×六棱杂种的每穗粒数、每株粒数较多、籽粒产量较高；而异棱型相配组杂种则比同棱型相配组有较高的株高、穗下节间长和千粒重。(2) 4种杂交类型杂种的类型内杂种间变异，在大多数性状上均为同质，仅有株高、穗长和主穗粒数在六棱×六棱杂种中变异增大，有较大的选择潜力。(3) 在13个数量性状中，有9个性状的Hh优势出现率与杂交类型显著关联；株高、穗下节间长和千粒重的Hh优势出现率在二棱×六棱和/或六棱×二棱杂种中最高，而主穗粒数、每穗粒数、每株粒数、每株粒重、每株干重的Hh优势出现率则在六棱×六棱和/或六棱×二棱杂种中最高。(4)异棱型相配组杂种的株高、穗下节间长和千粒重的Hh优势率显著高于同棱型相配组杂种，依次为20/30对8/33、30/30对18/33和22/30对5/33；但同棱型相配组杂种籽粒产量的Hh优势率显著高于异棱型相配组杂种，为10/33对2/30。说明异棱型杂种易产生生物量和千粒重优势，而同棱型杂种易产生籽粒产量优势。

关键词 大麦 杂种优势 棱型 同棱型或异棱型交配 杂种

分类号 S 512.3；Q 321 .6

Studies on the Heterosis of Barley (Hordeum vulgare L.)

XU Ru-Gen,LÜ, Chao,MIAO Li-Xia,MO Hui-Dong

Jiangsu Provincial Key Lab of Crop Genetics and Physiology, Yangzhou University, Yangzhou 225009, Jiangsu

Abstract Tow-row or six-row of kernel rows on a barley spike is an outstanding feature in barley morphology. Each node of the rachis on a barley spike has 3 spikelets, but only the central spikelet is fertile and 2 lateral spikelets are sterile in 2-row barley, while all 3 spikelets are fertile in 6-row barley. It can cause a considerable difference on agrinomic traits between 2- and 6-row barley cultivars. Generally speaking, there are more spikes per plant, larger , heavier and less kernels in 2-row barley cultivars, and more kernels and lower kernel weight in 6-row cultivars. In the present research, the trait performances and characteristics of F1 hybrids in 4 cross types, i.e., 2-row×2-row, 2-row×6-row, 6-row×2-row and 6-row×6-row, were investigated, and the occurrence rates of Hh, which stands for the hybrid value exceeding the higher parent significantly ($P<0.05$), were compared between the homo-row mating group(2-row×2-row and 6-row×6-row hybrids) and hetero-row mating group(2-row×6-row and 6-row×2-row hybrids). 13 barley quantitative traits, including plant height (PH), spike length excluding awns (SL), rachis internode length (RIL), spikes per plant (SP), kernels on main spike (KMS), kernels per spike (KPS), kernels per plant (KP), kernel weight per plant (KWP), dry matter weight per plant (DWP), kilograin weight (KW), kernel yield (KY), protein content (PC) and lysine content (LC), were evaluated for total of 63 hybrids and 17 parents in 2 randomized complete block trials each with 3 replications. The results are summarized as follows. (1) The hybrids from 2-row×2-row barley had longer spike, more spikes per plant and higher kilograin weight than that from 6-row×6-row barley, and 6-row×6-row hybrids had more kernels per spike and per plant, and higher kernel yield than 2-row×2-row hybrids. Hybrids in hetero-row mating group tended to have longer culm and rachis internode, and heavier kernel weight, compared with that in homo-row mating group（Table 2）. (2) The variation among hybrids within cross types was homogeneity in most traits, but significantly larger variation was observed in plant height, spike length and kernels on main spike in 6-row×6-row hybrids, which indicating a bigger potential for their selection in breeding（Table 3）. (3) The occurrence of Hh superiority was associated with cross type significantly in 9 traits out of 13. The highest Hh was found in 2-row×6-row and/or 6-row×2-row hybrids for plant height, rachis internode length and kilograin weigh ,while in 6-row×6-row and/or 6-row×2-row hybrids for kernels on main spike, per spike and per plant, kernel weight and dry matter weight per plant（Table 4）. (4) The Hh rates of plant height, rachis internode length and kilograin weight in hetero-row mating group hybrids were significantly higher than that in homo-row mating group, and took 20/30 vs. 8/33, 30/30 vs. 18/33 and 22/30 vs. 5/33 in result, respectively; however the Hh rate of kernel yield was 10/33 in homo-row mating group ,significantly higher than 2/30 of hetero-row mating group. Above facts suggest that the hetero-row mating hybrids may easily produce the superiority of

biomass and kernel weight, but the homo-row mating hybrids may be of benefit to economic yield superiority（Table 5）.
(5) The inheritance of barley row-type, the relationship between row-type and yield-related traits and the utilization of hybrids from different cross type were introduced and discussed briefly, together with the present evidences.

Key words Barley Heterosis Row-type Homo- or hetero- row mating Hybrid

DOI:

通讯作者 许如根 rgxu@yzu.edu.cn