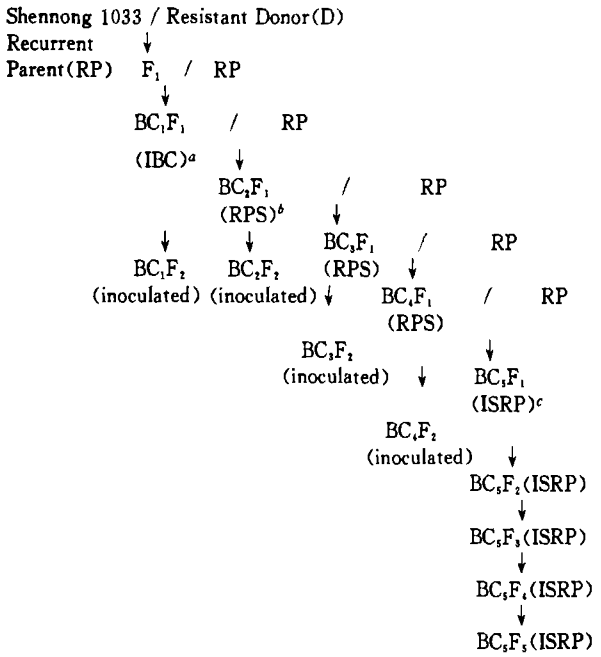

Procedural steps in breeding for near–isogenic line to bacterial blight resistance

[a] IBC=Inoculated before crossing. [b] RPS=Resistant plants selected. [c] ISRP=Inoculated and selected resistant plants.

Table 3. Analysis of genetics of near–isogenic lines for resistance to strains P_1 or T_1 of bacterial blight

Cross	Growth stages inoculated	Reaction of F_1[a]	Reaction of F_2: No. of resistant plants	Reaction of F_2: No. of susceptible plants	Reaction of F_2: Total plants	χ^2 (3 : 1)	P
Shennong1033/CBB3[b]	BS	R	197	66	263	0.001	0.90
Shennong1033/CBB4[c]	MTS	R	188	73	261	1.227	0.50~0.25
CBB3/Wase Aikoku 3[c]	BS	R	251	0	251		
CBB4/IR20[c]	MTS	R	257	0	257		
CBB12/Java 14[b]	BS	R	261	0	261		

[a] Average of 10 F_1 plants. [b] Inoculated with strain T_1. [c] Inoculated with strain P_1.

Long range migration of rice planthoppers and associated meteorological conditions in Yulin, Ganzhou, and Huangyan

TANG Jian, CNRRI, Hangzhou 310006, China

In recent years, it has been demonstrated that the low – level jet streams (LLJs) developed in the south of the Meiyu(Baiu) front play a critical role in the overseas migrations of the planthoppers into Japan and Korea. However, the involement of the LLJs during the process of sequential displacements of rice planthoppers in China has not been clarified yet. In the present studies, the synoptic meteorological factors including LLJs associated with the planthopper migrations in China were analyzed.

Daily light–trap data of WBPH and BPH during the period of Mar to Jul 1987–1993 collected at Yulin (southeast of Guangxi Autonomous Region of Zhuang Nationality; 22°39′N, 110°00′E), Ganzhou(south of Jiangxi Province; 25° 48′N, 115° 00′E) and Huangyan (south of Zhejiang Proivince; 29° 12′N, 121° 15′E) in China were employed in our study for the identification of immigration and emigration surges. Daily synoptic weather charts at ground and 850 hPa levels issued by the Japanese Meteorological Agency were used for the analyses of the meteorological conditions associated with the migration surges of the planthoppers. LLJs and trajectories of upper wind were analyzed by the computer programs formulated by Kyushu National Agri Experiment Station and Japan Weather Association, respectively.

1. General conditions of migration of plant-hoppers in China

Sporadic and intermittent immigration of planthoppers starts in late Mar in Yulin, late Apr in Ganzhou, and late May in Huangyan.

Massive emigrations of WBPH start in middle May in Yulin, early Jun in Ganzhou and end of Jun in Huangyan.

Massive emigration of BPH start in middle Jun in Yulin, early Jul in Ganzhou, and late Jul in Huangyan.

2. Meteorological conditions and factors associated with the migration of planthoppers

Synoptic weather conditions associated with the light trap catch peaks indicating the immigration of rice planthoppers were summarized as follows:

1) Rainfall: The light-trap catches of the rice planthoppers during the immigration periods were highly correlated with rainfall in Huangyan, while there was no significant correlation between them in Yulin. The conditions varied depending upon the immigration surges in Ganzhou.

2) Wind velocity: The wind velocity at 850 hPa level in each peak period of light-trap catches varied in the range from 2.5 to 18 m/s. However, the winds causing immigration were stronger in the western regions.

3) Wind direction: The frequency of southerly to southwesterly (s, ssw, sw, and wsw) winds at 850 hPa level was highest in Yulin, followed by Ganzhou, and lowest in Huangyan.

4) Frontal system: Immigration peaks of the planthoppers were closely related to the frontal system with depressions. Sixty, 42, and 54% of the light trap catches of the immigrations were recorded in the south of the frontal depressions, while 6, 33 and 28% of them were recorded in the north of the frontal system or on the system, in Yulin, Ganzhou, and Huangyan, respectively. The immigrations occurring in the south of the frontal systems were always mediated by winds associated with the warm sector of the frontal depression. The immigrations in the north of the frontal zone or on the zone were found to be linked with the trough and shear line at 850 hPa level, in association with the rainfall zone in the north.

5) LLJs: Significant role of LLJs in the immigration of the planthoppers into Yulin and Huangyan could not be revealed. On the other hand, the massive emigration of the planthoppers from Ganzhou and Huangyan was closely related to the development of LLJs associated with the conspicuous frontal system (Meiyu or Baiu front).

3. Trajectories of migration routes of the rice planthoppers in China

Possible migration routes of the rice planthoppers were examined by trajectory analyses of upper winds at 850 hPa level.

1) The 48-hr fore-trajectories started from Ganzhou in each trap catch peak period in Jun and Jul, which indicated the massive emigration of the planthoppers, mostly reaching the Yellow Sea up to the Korean Peninsula while those from Yulin extended to Hubei up to the southern Henan Provinces through the western part of Hunan Province.

2) The 48-hr fore-trajectories from Huangyan in each mass trap period during the Meiyu (Baiu) season extended over the western part of Japan, and occasionally reached as far as the northern part of Japan. The same 24-hr fore-trajectories from Huangyan extended toward Kyushu Island, and 50% of them reached the island.

3) The 24-hr back-trajectories from Huangyan in the rainy season could be traced to the southern part of Fujian and eastern part of Guangdong Provinces.

Sporadic and intermittent immigrations of rice planthoppers into Yulin and Ganzhou occurred under the prevalence of southerly winds generated in the south of the frontal system appearing over South China. The immigrations into Ganzhou and Huangyan were also strongly related to rainfall associated with frontal systems over Guangxi , Guangdong, and Fujian Provinces.

Massive emigration of the rice planthoppers from Ganzhou and Huangyan in Jun and Jul coincided with the development of LLJs associated with the Meiyu (Baiu) front.

Ganzhaoxian 11—A product of anther culture in indica rice

ZHU Deyao, PAN Xigan, CHEN Chengyao, DING Xiaohua, YI Jianhua, and CHANG Zhiyuan. Rice Res Inst, Jiangxi Acad of Agri Scie, Nanchang 330200, China

With an increase of green plant induction frequency in anther culture of indica rice , an early season indica variety Ganzhaoxian 11 was developed. It has been released by the Committee of Crop Variety Identification, with over 150,000 ha.

In the spring of 1978, the anthers from indica hybrid rice Shanyou 2, were adopted as the explant for inoculation. After differentiation culture for 24 d, one of induced calli was transferred onto the differentiation medium. Green plantlets were regenerated 15 d later. Individual plants were grown and tested for the chromosome number and the agronomic traits in the fall of 1978 and the early season of 1979. Three inbred lines (No. 369, 370, and 371) showing early maturity and promising chafacteristics were selected for further studies.

The yield traits of the lines for 4 yr showed that the yield of the line Shanhua 369 increased over 4. 35%— 11. 49% as compared to the CK. From 1984 to 1985, Shanhua 369 passed through the provincial region tests. In the early of 1990, it was officially named Ganzhaoxian 11 and released by the Provincial Committee of Crop Variety Identification for production.

Agronomic characters The plant height of Ganzhaoxian 11 is about 80 cm, the panicle length about 17 cm long, the number of the filled grains per panicle aprox 75, the seed setting—rate about 76%, and 1000 —grain weight about 23 g.

Early maturity Ganzhaoxian 11 is a temperature—sensitive variety, requiring about 1689℃ of accumulated active temperature from sowing to the heading. Between latitude 25—30°N, the whole growth duration is 100—110 d, 24—30 d shorter than that of Shanyou 2. This favors for the late season rice to transplant earlier to gain a bumper harvest around year.

High and stable yield Yield trials from 1980 to 1983 showed that Ganzhaoxian 11 gave a yield higher than the CK 7055 each year, with the mean value of 6. 7%. In production trials, this variety shows significant yield potential about 5,250—6,000 kg/ha and up to 7500 kg/ha at the fertilizering level of 75—112. 5 kg N/ha, which is being increased by 6. 5—40. 9% as compared to the local commercial varieties with similar growth duration. Ganzhaoxian 11 has also shown to have stable yield among different years. The regional test with 15 sites of Jiangxi Province in 1984 showed that the minimum yield of Ganzhaoxian 11 was 3594 kg/ha, and the maximum 7062 kg/ha, with the range of 3468 kg and CV of 17.6%. While as the minimum and maximum yields the control (7075) were 2694 kg/ha and 6975 kg/ha respectively , with the range of 4281 kg and CV 20. 32%. It can be widely grown in plateau regions, hill regions and even in cold water emersed fields of mountainous place for both Jiangxi and the adjacent provinces.

Strong tolerance to coldness in seedling stage Three days after germinating, young seedlings of Ganzhaoxian 11 as well as those of newly bred varieties 7055, 6001, Zhaoxian 14, and local cold—tolerant variety Lengshuibai and a japonica variety Hei—xuan 5, were treated at 4℃ for 10 d, followed by temperature sharply going up to 25 ℃ for 10 d. Results indicated that the survival rates of seedling for