Supplementary Materials

Table S1. Agro-climatic characteristics of environments in yields stability experiments for 62 maize hybrids.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Environment** | **Center** | **Soil Type** | **Max Rainfall (mm)** | **Min Rainfall (mm)** | **Max Temperature (°C)** | **Min Temperature (°C)** | **Latitude** | **Longitude** |
| E1 | Coimbatore | Black soil | 151.6 | 39.9 | 33.3 | 21.5 | 11.0168° N | 76.9558° E |
| E2 | Dharwad | Black soil | 128.4 | - | 31.6 | 20 | 15.4589° N | 75.0078° E |
| E3 | Hyderabad | black soil | 159.6 | 43.2 | 34.7 | 16.5 | 17.4065° N | 78.4772° E |
| E4 | Karimnagar | sandy loam | 319 | 17.0 | 38.1 | 12.4 | 18.4386° N | 79.1288° E |

Table S2. Details of parametric and non-parametric methods.

|  |  |  |
| --- | --- | --- |
| Wricke’s ecovalence | *Wi2* | Introduced by Wricke in 1962, ecovalence (*Wi*) quantifies the contribution of each hybrid to the sum of squares of hybrid-environment interaction. It is calculated by squaring and summing the interactions of a hybrid across different environments. Hybrids with lower ecovalence values demonstrate less deviation from the mean performance across environments, indicating greater stability. |
| Regression coefficient | *bi* | The regression coefficient (*bi*) was proposed by Finlay and Wilkinson in 1963 as a measure of a hybrid's response to the environmental index derived from the average performance of all hybrids in each environment. A *bi* value not significantly differing from 1 suggests adaptation of the hybrid to all environments. A *bi* > 1 indicates higher sensitivity to environmental changes and specificity in adaptability to high-yielding environments, while *bi* < 1 signifies greater resistance to environmental changes and specificity in adaptability to low-yielding environments. |
| Deviation from regression | *S2di* | In addition to the regression coefficient, the variance of deviations from the regression (*S2di*) is commonly used for selecting stable hybrids. Hybrids with *S2di* = 0 are considered most stable, while *S2di* > 0 indicates lower stability across environments, with hybrids exhibiting lower values being more desirable. |
| Shukla’s stability variance | *σ2i* | Shukla proposed the stability variance of hybrid i in 1972 as its variance across environments after removing the main effects of environmental means. Hybrids with minimum values of *σ2i* are intended to be more stable. |
| Coefficient of variance | *CVi* | Francis and Kannenberg suggested the coefficient of variation (*CVi*) in 1987 as a stability statistic combining the coefficient of variation, mean yield, and environmental variance. Hybrids with low *CVi*, low environmental variance (EV), and high mean yield are considered most desirable. |
| Huhn’s and Nassar and Huhn’s non-parametric statistics | *S(1)*  *S(2)*  *S(3)*  *S(6)* | Huhn (1990) and Nassar (1987) introduced four non-parametric statistics, including *S(1), S(2), S(3),* and *S(6*), which assess hybrid stability based on ranks derived from mean yield data across environments. Lower values of these statistics indicate higher stability for a hybrid. |
| Thennarasu’s non-parametric statistics | *NP(1)*  *NP(2)*  *NP(3)*  *NP(4)* | Thennarasu (1995) defined four alternative non-parametric stability statistics, *NP(1)* to *NP(4)*, based on the ranks of adjusted means of hybrids in each environment. Low values of these statistics signify high stability. |
| Kang’s rank-sum | *Kang or KR* | Kang's rank-sum, proposed by Kang in 1988, utilizes both yield and stability variance (*σ2i*) as selection criteria. It assigns equal weight to yield and stability statistics, ranking hybrids based on their performance. Hybrids with the lowest rank-sum are considered the most desirable, indicating high yield and stability. |

Table S3. Sum ranks of stability parameters, rank of grain yield, genotypic code according to dendogram of 62 maize hybrids.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sum Ranks of Stability Parameters** | **Rank of Grain Yield** | **Genotypic Code** |  |
| 645 | 50 | G42 |  |
| 702 | 46 | G34 |  |
| 526 | 45 | G16 |  |
| 711 | 56 | G39 |  |
| 666 | 60 | G11 |  |
| 746 | 58 | G17 | CLUSTER IV |
| 739 | 18 | G40 |  |
| 707 | 27 | G25 |  |
| 720 | 17 | G58 |  |
| 657 | 37 | G44 |  |
| 773 | 40 | G41 |  |
| 731 | 35 | G18 |  |
| 778 | 39 | G5 |  |
| 540 | 13 | G14 |  |
| 513 | 12 | G6 |  |
| 485 | 6 | G13 |  |
| 512 | 5 | G49 |  |
| 443 | 3 | G54 | CLUSTER V |
| 489 | 9 | G28 |  |
| 546 | 28 | G61 |  |
| 580 | 32 | G8 |  |
| 599 | 19 | G57 |  |
| 666 | 20 | G32 |  |
| 710 | 34 | G7 |  |
| 546 | 43 | G59 |  |
| 536 | 41 | G55 |  |
| 525 | 38 | G50 |  |
| 420 | 36 | G45 |  |
| 497 | 42 | G3 |  |
| 446 | 49 | G24 |  |
| 440 | 47 | G15 |  |
| 362 | 48 | G19 | CLUSTER III |
| 429 | 54 | G37 |  |
| 357 | 57 | G52 |  |
| 351 | 52 | G29 |  |
| 561 | 55 | G35 |  |
| 551 | 53 | G23 |  |
| 491 | 51 | G60 |  |
| 498 | 62 | G22 |  |
| 654 | 59 | G53 |  |
| 632 | 61 | G38 |  |
| 327 | 4 | G10 |  |
| 444 | 16 | G1 |  |
| 362 | 10 | G33 |  |
| 330 | 2 | G48 |  |
| 200 | 1 | G46 | CLUSTER I |
| 305 | 11 | G62 |  |
| 353 | 7 | G9 |  |
| 365 | 30 | G21 |  |
| 376 | 29 | G4 |  |
| 430 | 25 | G43 |  |
| 344 | 24 | G36 |  |
| 156 | 31 | G20 |  |
| 79 | 23 | G2 |  |
| 190 | 15 | G30 |  |
| 126 | 14 | G26 |  |
| 222 | 44 | G56 | CLUSTER II |
| 164 | 8 | G51 |  |
| 156 | 21 | G31 |  |
| 276 | 26 | G27 |  |
| 278 | 22 | G12 |  |
| 362 | 33 | G47 |  |