Table 1. Range of variation for various traits of pearl millet germplasm from different latitudes on both sides of equator, evaluated at ICRISAT, Patancheru, India.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lata | No. of accs | Freq (%) | DFLRb | DFLPR | PHTR | PHTR | TTR | PTR | PLR | PLPR | PWR | PWPR | SDWT |
| EC | 15904 |  | 33-159 | 33-138 | 80-490 | 48-425 | 1-35 | 1-19 | 9-135 | 4-125 | 10-58 | 10-61 | 1.5-19.3 |
| NH | 12808 | 80.5 | 33-159 | 33-132 | 80-490 | 48-425 | 1-35 | 1-19 | 9-135 | 6-125 | 10-55 | 10-55 | 1.5-19.3 |
| SH | 3096 | 19.5 | 43-135 | 45-138 | 90-430 | 69-310 | 1-15 | 1-13 | 9-66 | 4-75 | 12-58 | 10-61 | 2.5-19.3 |
| NH-HL | 3,235 | 25.4 | 33-139 | 33-120 | 80-374 | 57-290 | 1-28 | 1-13 | 11-50 | 9-57 | 13-36 | 10-38 | 2.4-16.5 |
| NH-LL | 9,573 | 74.7 | 36-159 | 38-132 | 80-490 | 48-425 | 1-35 | 1-19 | 9-135 | 6-125 | 10-55 | 10-55 | 1.5-19.3 |
| SH-HL | 409 | 13.2 | 43-114 | 60-113 | 130-335 | 70-300 | 1-8.8 | 1-5.8 | 9-55 | 8-60 | 13-55 | 14-54 | 3.4-19.3 |
| SH-LL | 2,687 | 86.8 | 44-135 | 45-138 | 90-430 | 69-310 | 1-15.4 | 1-8.4 | 13-66 | 4-75 | 12-58 | 10-61 | 2.5-15.3 |
| 30-35 N | 330 | 2.6 | 36-73 | 48-84 | 110-290 | 65-230 | 1-8.7 | 1-6.9 | 14-43 | 11-50 | 14-30 | 13-30 | 3.35-10 |
| 25-30 N | 1805 | 14.1 | 38-103 | 48-88 | 80-374 | 60-290 | 1-18.5 | 1-8.6 | 13-50 | 11-57 | 13-35 | 11-35 | 3.2-16.5 |
| 20-25 N | 1100 | 8.6 | 33-139 | 33-120 | 90-328 | 57-265 | 1-28 | 1-13 | 11-50 | 9-56 | 13-36 | 10-38 | 2.4-12.4 |
| 15-20 N | 1963 | 15.3 | 38-125 | 45-120 | 106-410 | 70-330 | 1-35 | 1-19 | 10-66 | 6-63 | 10-42 | 10-42 | 2.2-15.8 |
| 10-15 N | 6291 | 49.1 | 36-152 | 38-132 | 90-490 | 48-425 | 1-35 | 1-17.7 | 9-135 | 7-125 | 10-55 | 10-55 | 1.5-19.3 |
| 5-10 N | 1225 | 9.6 | 39-159 | 41-132 | 80-480 | 50-320 | 1-13.3 | 1-8.5 | 9-85 | 8-100 | 13-47 | 10-42 | 2-18.6 |
| 0-5 N | 94 | 0.7 | 45-146 | 47-96 | 115-360 | 90-220 | 1-5.8 | 1-5 | 12-35 | 11-36 | 16-31 | 14-40 | 4.3-13.4 |
| 0-5 S | 195 | 6.3 | 45-135 | 49-110 | 190-390 | 104-285 | 1-4 | 1-4 | 14-52 | 15-75 | 18-35 | 17-47 | 4.5-11.6 |
| 5-10 S | 232 | 7.5 | 47-130 | 62-138 | 205-401 | 106-280 | 1-4.6 | 1-4.3 | 13-54 | 4-75 | 12-38 | 11-52 | 2.5-11.2 |
| 10-15 S | 192 | 6.2 | 48-121 | 50-95 | 94-380 | 69-225 | 1-13.5 | 1-8.4 | 15-36 | 12-35 | 16-40 | 13-32 | 3.2-10.5 |
| 15-20 S | 2068 | 66.8 | 44-122 | 45-110 | 90-430 | 70-310 | 1-15.4 | 1-7.5 | 13-66 | 12-68 | 14-58 | 10-61 | 2.7-15.3 |
| 20-25 S | 398 | 12.9 | 43-114 | 60-113 | 130-335 | 70-300 | 1-8.8 | 1-5.8 | 9-55 | 8-60 | 13-55 | 14-54 | 3.4-19.3 |
| 25-30 S | 8 | 0.3 | 50-69 | 64-75 | 170-260 | 130-205 | 1.6-4.3 | 1.2-3 | 20-42 | 17-41 | 22-35 | 19-32 | 5.5-10.2 |
| 30-35 S | 3 | 0.1 | 65-68 | 65-75 | 210-260 | 180-210 | 1.6-1.8 | 1.2-1.4 | 27-48 | 29-34 | 25-29 | 23-31 | 5.8-8.1 |

a Lat=Latitude,EC=Entire collection, NH=Northern hemisphere and SH=Southern hemisphere.

NH-HL=Northern hemisphere higher latitude (>200), NH-LL=Northern hemisphere lower latitude (<200), SH-HL=Southern hemisphere higher latitude (>200) and SH-LL=Southern hemisphere lower latitude (<200).

b DFLR=Days to 50% flowering in rainy, DFLPR=Days to 50% flowering in postrainy, PHTR=Plant height (cm) in rainy, PHTPR=Plant height (cm) in postrainy, TTR=Total tillers/plant in rainy, PTR=Productive tillers/plant in rainy, PLR=Panicle length (cm) in rainy, PLPR=Panicle length (cm) in postrainy, PWR=Panicle width (mm) in rainy, PWPR=Panicle width (mm) in postrainy, SDWT=1000-Seed weight.

 Table 2. Meana values for various traits of pearl millet germplasm from different latitudes on both sides

 of equator, evaluated at ICRISAT, Patancheru, India.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Latb | DFLRc | DFLPR | PHTR | PHTPR | TTR | PTR | PLR | PLPR | PWR | PWPR | SDWT |
| EC |  75.5 | 70.6 | 255.5 | 163.5 | 2.6 | 2.1 | 28.4 | 25.8 | 24 | 23 | 8.6 |
| NH | 75.4a | 69.4b | 250.7b | 159.2b | 2.8a | 2.2a | 27.4b | 24.5b | 23.2b | 22.0b | 8.7a |
| SH | 75.9a | 75.8a | 275.3a | 181.1a | 1.8b | 1.5b | 32.5a | 31.2a | 27.3a | 27.3a | 8.1b |
| NH-HL | 56.55d | 66.67d | 204.10d | 162.10c | 3.04a | 2.40a | 23.40c | 20.31d | 21.71d | 20.64d | 7.65c |
| NH-LL | 81.74a | 70.27c | 266.40b | 158.20d | 2.76b | 2.12b | 28.78b | 25.87c | 23.77c | 22.47c | 9.09a |
| SH-HL | 67.82c | 82.51a | 228.10c | 175.50b | 2.24c | 1.68c | 28.83b | 29.31b | 26.61b | 28.97a | 7.71c |
| SH-LL | 77.10b | 74.76b | 282.50a | 181.90a | 1.75d | 1.50d | 33.05a | 31.49a | 27.41a | 27.08b | 8.18b |
| 30-35 N | 51.3e | 64.4e | 184.0e | 147.5c | 3.4a | 2.5b | 22.9cd | 20.0c | 20.8d | 20.0c | 7.4e |
| 25-30 N | 58.0d | 67.8d | 220.2d | 166.5a | 3.0b | 2.5b | 24.5b | 20.8c | 21.6c | 20.5b | 7.6d |
| 20-25 N | 55.7d | 65.5e | 183.8e | 159.2b | 3.0b | 2.3cb | 21.8d | 19.5c | 22.0c | 21.0b | 7.7d |
| 15-20 N | 65.0c | 68.2d | 227.4c | 161.0b | 2.9b | 2.2c | 22.3d | 19.9c | 23.2b | 22.5a | 7.8d |
| 10-15 N | 82.5b | 70.2c | 274.4b | 157.7b | 2.6c | 2.0d | 31.4a | 28.3a | 24.1a | 22.5a | 9.5a |
| 5-10 N | 104.7a | 73.6a | 290.7a | 157.9b | 3.1ba | 2.4cb | 25.9b | 23.4b | 22.8b | 22.0a | 9.0b |
| 0-5 N | 83.6b | 71.9b | 230.6c | 150.8c | 3.2ba | 2.7a | 23.5cd | 21.1c | 23.2b | 22.7a | 8.2c |
| 0-5 S | 103.4a | 87.1a | 301.0a | 187.5a | 1.7b | 1.4b | 29.2bc | 30.3ba | 25.7a | 28.0a | 6.7bc |
| 5-10 S | 107.8a | 93.1a | 301.3a | 196.0a | 1.5b | 1.3b | 32.2bac | 35.1a | 24.9a | 27.3ba | 7.2bac |
| 10-15 S | 72.3b | 68.1b | 240.3c | 148.8b | 3.0a | 2.5a | 25.4c | 23.2b | 23.4a | 22.2b | 6.2c |
| 15-20 S | 71.6b | 72.2b | 282.6ba | 182.9a | 1.7b | 1.4b | 34.2ba | 32.0a | 28.2a | 27.4ba | 8.6a |
| 20-25 S | 67.9b | 82.8a | 228.2c | 175.4a | 2.2ba | 1.7b | 28.8bc | 29.3ba | 26.6a | 29.1a | 7.7bac |
| 25-30 S | 66.7b | 71.0b | 216.3c | 176.3a | 2.5ba | 1.9b | 29.1bc | 29.3ba | 27.1a | 24.9ba | 8.3ba |
| 30-35 S | 63.4b | 68.7b | 240.0bc | 196.7a | 1.7b | 1.3b | 37.0a | 31.0a | 27.3a | 26.7ba | 7.1bac |

a Means were tested by Newman-Keuls test and means followed by different letters are significantly different at P=0.05

b Lat=Latitude,EC=Entire collection, NH=Northern hemisphere and SH=Southern hemisphere.

NH-HL=Northern hemisphere higher latitude (>200), NH-LL=Northern hemisphere lower latitude (<200), SH-HL=Southern hemisphere higher latitude (>200) and SH-LL=Southern hemisphere lower latitude (<200).

c DFLR=Days to 50% flowering in rainy, DFLPR=Days to 50% flowering in postrainy, PHTR=Plant height (cm) in rainy, PHTPR=Plant height (cm) in postrainy, TTR=Total tillers/plant in rainy, PTR=Productive tillers/plant in rainy, PLR=Panicle length (cm) in rainy, PLPR=Panicle length (cm) in postrainy, PWR=Panicle width (mm) in rainy, PWPR=Panicle width (mm) in postrainy, SDWT=1000-Seed weight.

Table 3. Shannon-Weaver diversity index (H') for various traits of pearl millet germplasm from different latitudes on both sides of equator, evaluated at ICRISAT, Patancheru, India.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lata | DFLRb | DFLPR | PHTR | PHTPR | TTR | PTR | PLR | PLPR | PWR | PWPR | SDWT | Mean | Se+ |
| EC | 0.584 | 0.604 | 0.627 | 0.632 | 0.427 | 0.437 | 0.567 | 0.567 | 0.610 | 0.607 | 0.615 | 0.574 | 0.020 |
| NH | 0.576 | 0.610 | 0.632 | 0.622 | 0.432 | 0.450 | 0.537 | 0.544 | 0.598 | 0.612 | 0.616 | 0.569 | 0.019 |
| SH | 0.526 | 0.610 | 0.612 | 0.637 | 0.359 | 0.383 | 0.610 | 0.599 | 0.626 | 0.610 | 0.620 | 0.563 | 0.027 |
| Mean | 0.551 | 0.610 | 0.622 | 0.630 | 0.395 | 0.417 | 0.574 | 0.572 | 0.612 | 0.611 | 0.618 | 0.566 | 0.023 |
| Se+ | 0.025 | 0.0001 | 0.010 | 0.008 | 0.036 | 0.033 | 0.036 | 0.028 | 0.014 | 0.001 | 0.002 | 0.003 | 0.004 |
| NH-HL | 0.595 | 0.578 | 0.632 | 0.625 | 0.498 | 0.528 | 0.631 | 0.601 | 0.621 | 0.610 | 0.615 | 0.597 | 0.012 |
| NH-LL | 0.587 | 0.600 | 0.624 | 0.611 | 0.417 | 0.419 | 0.561 | 0.544 | 0.612 | 0.626 | 0.621 | 0.567 | 0.021 |
| SH-HL | 0.603 | 0.619 | 0.599 | 0.616 | 0.462 | 0.456 | 0.596 | 0.603 | 0.604 | 0.613 | 0.590 | 0.580 | 0.017 |
| SH-LL | 0.534 | 0.619 | 0.620 | 0.626 | 0.330 | 0.366 | 0.626 | 0.589 | 0.624 | 0.603 | 0.622 | 0.560 | 0.030 |
| Mean | 0.580 | 0.604 | 0.619 | 0.619 | 0.426 | 0.442 | 0.603 | 0.584 | 0.615 | 0.613 | 0.612 | 0.576 | 0.019 |
| SE± | 0.016 | 0.009 | 0.007 | 0.004 | 0.036 | 0.034 | 0.016 | 0.014 | 0.005 | 0.005 | 0.007 | 0.008 | 0.004 |
| 30-35 N | 0.608 | 0.594 | 0.629 | 0.635 | 0.556 | 0.512 | 0.626 | 0.600 | 0.598 | 0.615 | 0.626 | 0.598 | 0.010 |
| 25-30 N | 0.627 | 0.623 | 0.625 | 0.616 | 0.533 | 0.560 | 0.607 | 0.606 | 0.636 | 0.616 | 0.607 | 0.606 | 0.009 |
| 20-25 N | 0.493 | 0.600 | 0.604 | 0.624 | 0.427 | 0.477 | 0.619 | 0.623 | 0.601 | 0.607 | 0.619 | 0.575 | 0.020 |
| 15-20 N | 0.590 | 0.580 | 0.611 | 0.621 | 0.457 | 0.477 | 0.576 | 0.555 | 0.646 | 0.614 | 0.631 | 0.578 | 0.017 |
| 10-15 N | 0.601 | 0.628 | 0.626 | 0.624 | 0.386 | 0.386 | 0.570 | 0.565 | 0.615 | 0.617 | 0.615 | 0.571 | 0.026 |
| 5-10 N | 0.519 | 0.511 | 0.616 | 0.616 | 0.558 | 0.523 | 0.579 | 0.569 | 0.599 | 0.636 | 0.636 | 0.579 | 0.013 |
| 0-5 N | 0.384 | 0.632 | 0.623 | 0.619 | 0.599 | 0.608 | 0.609 | 0.629 | 0.582 | 0.571 | 0.594 | 0.583 | 0.020 |
| Mean | 0.546 | 0.595 | 0.619 | 0.622 | 0.502 | 0.506 | 0.598 | 0.593 | 0.611 | 0.611 | 0.618 | 0.584 | 0.016 |
| Se+ | 0.033 | 0.016 | 0.004 | 0.003 | 0.030 | 0.027 | 0.008 | 0.011 | 0.008 | 0.007 | 0.006 | 0.005 | 0.002 |
| 0-5 S | 0.490 | 0.568 | 0.613 | 0.602 | 0.482 | 0.364 | 0.605 | 0.582 | 0.564 | 0.585 | 0.584 | 0.549 | 0.021 |
| 5-10 S | 0.528 | 0.641 | 0.606 | 0.604 | 0.364 | 0.268 | 0.602 | 0.613 | 0.595 | 0.626 | 0.612 | 0.555 | 0.034 |
| 10-15 S | 0.502 | 0.603 | 0.572 | 0.627 | 0.462 | 0.460 | 0.605 | 0.602 | 0.592 | 0.601 | 0.614 | 0.570 | 0.017 |
| 15-20 S | 0.577 | 0.595 | 0.627 | 0.616 | 0.355 | 0.354 | 0.626 | 0.620 | 0.623 | 0.630 | 0.627 | 0.569 | 0.029 |
| 20-25 S | 0.603 | 0.617 | 0.601 | 0.617 | 0.462 | 0.457 | 0.602 | 0.620 | 0.608 | 0.615 | 0.593 | 0.583 | 0.017 |
| 25-30 S | 0.391 | 0.391 | 0.470 | 0.423 | 0.391 | 0.391 | 0.423 | 0.470 | 0.391 | 0.527 | 0.545 | 0.440 | 0.016 |
| 30-35 S | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.276 | 0.000 |
| Mean  | 0.481 | 0.527 | 0.538 | 0.538 | 0.399 | 0.367 | 0.534 | 0.541 | 0.521 | 0.552 | 0.550 | 0.506 | 0.019 |
| Se+ | 0.043 | 0.0522 | 0.048 | 0.051 | 0.028 | 0.029 | 0.051 | 0.048 | 0.051 | 0.048 | 0.047 | 0.042 | 0.004 |

a Lat=Latitude,EC=Entire collection, NH=Northern hemisphere and SH=Southern hemisphere.

NH-HL=Northern hemisphere higher latitude (>200), NH-LL=Northern hemisphere lower latitude (<200), SH-HL=Southern hemisphere higher latitude (>200) and SH-LL=Southern hemisphere lower latitude (<200).

b DFLR=Days to 50% flowering in rainy, DFLPR=Days to 50% flowering in postrainy, PHTR=Plant height (cm) in rainy, PHTPR=Plant height (cm) in postrainy, TTR=Total tillers/plant in rainy, PTR=Productive tillers/plant in rainy, PLR=Panicle length (cm) in rainy, PLPR=Panicle length (cm) in postrainy, PWR=Panicle width (mm) in rainy, PWPR=Panicle width (mm) in postrainy, SDWT=1000-Seed weight.

Table 4. Range of variation for climatic variables in different latitudinal ranges on either side of equator.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Latitudea | Min. Temperature (oC) | Max. Temperature (oC) | Day length (h) | Annual mean rainfall (mm) |
| LMMb | HMMc | LMM | HMM | LMM | HMM |
| Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 30-35 N | -17.6 | 7.7 | 6.6 | 28.9 | -9.2 | 21.3 | 17.7 | 43.4 | 9.9 | 10.3 | 14.0 | 14.0 | 559.4 |
|  25-30 N | 0.7 | 10.6 | 23.6 | 30.2 | 15.8 | 25.8 | 34.9 | 43.9 | 10.3 | 10.6 | 14.0 | 14.0 | 681.4 |
|  20-25 N | 7.2 | 15.7 | 21.9 | 28.9 | 23.2 | 31.2 | 30.5 | 43.1 | 10.6 | 10.9 | 13.0 | 14.0 | 765.6 |
|  15-20 N | 0.2 | 21.0 | 11.5 | 29.3 | 18.2 | 34.3 | 26.7 | 43.0 | 10.9 | 11.2 | 13.0 | 13.0 | 675.5 |
|  10-15 N | -0.8 | 21.7 | 9.7 | 28.8 | 16.5 | 36.6 | 22.2 | 42.4 | 11.3 | 11.5 | 13.0 | 13.0 | 703.8 |
|  5-10 N | 10.0 | 23.0 | 16.7 | 27.3 | 23.3 | 34.6 | 30.3 | 39.6 | 11.5 | 11.8 | 12.0 | 13.0 | 1218.0 |
|  0-5 N | 9.2 | 22.0 | 11.0 | 23.8 | 22.7 | 28.7 | 26.5 | 34.0 | 11.8 | 12.1 | 12.0 | 12.0 | 1595.0 |
|  0-5 S | 6.1 | 19.3 | 10.4 | 23.1 | 16.3 | 28.9 | 20.8 | 33.1 | 11.8 | 12.1 | 12.1 | 12.4 | 797.4 |
|  5-10 S | 9.3 | 19.5 | 14.3 | 24.4 | 21.5 | 30.0 | 26.4 | 33.5 | 11.6 | 11.8 | 12.4 | 12.6 | 705.6 |
|  10-15 S | 5.8 | 17.7 | 15.2 | 23.0 | 20.2 | 29.4 | 26.9 | 36.1 | 11.2 | 11.5 | 12.7 | 12.9 | 981.5 |
|  15-20 S | 3.9 | 17.1 | 13.1 | 23.5 | 15.4 | 29.2 | 22.8 | 37.2 | 10.9 | 11.2 | 13.0 | 13.3 | 647.0 |
|  20-25 S | 2.9 | 12.5 | 15.4 | 21.2 | 18.3 | 27.3 | 25.4 | 35.0 | 10.6 | 10.9 | 13.3 | 13.6 | 579.9 |
|  25-30 S | -1.1 | 10.8 | 14.9 | 21.0 | 15.8 | 25.0 | 28.5 | 32.3 | 10.2 | 10.4 | 13.7 | 13.9 | 577.5 |
| 30-35 S | 3.9 | 7.2 | 14.5 | 16.6 | 17.8 | 20.2 | 24.9 | 27.5 | 9.9 | 10.1 | 14.0 | 14.2 | 718.0 |

a N=Northern hemisphere and S=Southern hemisphere

  b LMM=Lowest monthly mean, c HMM– Highest monthly mean