Spearman correlation per tree Nut Length -12 17 33 6 -19 32 -19 12 -8 15 21 1 8 -1 Nut Height -7 -6 -15 3 19 10 0 -3 8 -3 1 1 0 Nut Width -17 25 18 0 -1 11 -1 -17 12 1 -4 12 1 -2 4 Nut Volume -15 17 19 2 7 -5 0 11 -3 -17 19 -4 -3 -4 5 **-9 71 34 10** 9 17 2 -27 8 2 -25 12 Nut VA3D 12 4 33 -5 0 25 -10 17 16 -7 1 -23 18 Nut Feret Ratio-4 11 0 -3 -14 28 23 1 -7 -3 13 -3 -21 18 0 0 7 -3 6 Nut Surface Area **Nut Sphericity** 26 7 **-72-35**-10-10-18 -7 3 -12 -3 **27** -12 -3 Nut Convex Surface Area -13 22 22 -5 -2 -6 1 12 -3 -19 19 1 -3 6 Nut Convex Volume -14 21 21 -5 -3 -19 18 -2 -3 -5 5 1 12 1 8 23 **-65**-22 -12 -3 -15 20 Nut Ratio Convex Area 10 1 4 9 -7 -8 -3 -8 **-78-39** -12 -10 -13 -3 26 24 -7 -4 -6 -3 -9 -1 Nut Ratio Convex Volume -3 -27 9 -17 -17 -7 7 -1 -11 -1 3 Krumbein Index 6 0 34 23 -19 -19 10 -17 -15 5 -29 -1 -10 3 21 -14 2 0 1 Sneed Index -1 **45** 16 -3 -12 -23 15 6 -17 -31 -20 -15 -2 Air Volume - 16 19 4 5 22 -7 13 -4 11 13 -4 4 11 Kernel Volume -15 6 -1 24 28 18 <mark>54 66</mark> 27 3 29 -63 8 Shell Volume 4 9 -8 0 5 Packing Volume -12 10 20 10 21 23 10 2 19 3 14 15 -10 -7 8 Air Vol Ratio -12 11 -13 -27 -60 -53 -22 **-39 36** -62 6 7 2 -32 -7 -2 -24 4 3 14 4 -3 <mark>61</mark> -8 -7 -7 43 12 21 5 Kernel Vol Ratio-Shell Vol Ratio-21 12 18 32 74 78 34 43 -82 28 -7 -9 5 2 7 Packing Vol Ratio-32 39 22 17 34 -11 2 2 2 -2 16 32 -11 0 1 <del>-8</del> **72 35** 10 10 17 Shell Rugosity -26 7 -3 12 3 2 -26 12 41 -82 16 12 21 28 **72 82 34** 24 -2 Shell Thickness -10 0 3 8 10 10 15 30 30 25 Protruding Shell Ratio 3 5 0 -3 8 -4 33 -33 3 Protruding Shell Volume-40 6 22 24 20 51 57 31 6 7 -7 8 2 8 Kernel Length -14 9 **32** -6 1 2 -3 -3 9 12 -3 25 0 16 15 Kernel Height 10 -7 3 -9 2 -9 9 -4 3 3 -2 13 11 -1 7 Kernel Width -- 20 13 12 -13 -12 -2 -9 -7 -4 -6 15 -2 18 3 Kernel Surface Area -19 8 25 9 20 -2 33 5 -6 10 -2 0 9 8 Kernel Convex Volume -17 10 20 -10 -2 6 -6 -5 15 0 -3 18 -2 8 7 Kernel Convex Area -17 11 21 -10 -2 -7 -2 7 6 -6 16 0 -3 17 8 <mark>-51</mark>-17 <mark>58</mark>-22 -8 11 -19 -7 -20 -16 -4 2 Kernel Ratio Convex Area-9 4 -1 12 31 28 **55** 29 15 -10 10 2 -8 -5 -4 Kernel Ratio Convex Volume-8 -18 6 -5 9 Kernel Cavity Area --22 1 **21** -16 -5 1 4 13 1 11 -4 8 -5 Kernel Cavity Volume -18 0 **19** -15 -5 2 0 -4 1 -2 -2 9 -3 10 7 Kernel Arc Height -2 14 21 14 25 23 22 10 0 2 15 -17 7 1 Kernel Cavity Height 12 1 28 -16 5 4 20 1 -6 2 1 -3 13 15 Kernel Sphericity - 17 -9 -14 -3 9 -5 -26 -1 -25 -5 -11 3 3 -3 Kernel Ratio Cavity Area -11 -9 7 -21 -13 -12 6 -23 -5 -25 -18 3 3 -1 Kernel Ratio Cavity Volume -- 10 - 13 8 - 15 - 6 - 3 -5 -18 5 4 -11 -6 2 0 Density Kernel vs Shell-15 -6 -22-15-55-65-18-27 -1 -13 -29 64 7 -6 7 5 -12 -22 -28 16 -6 Density Packing vs Shell - -5 -4 8 -4 16 -6 2 20 2 6 -13 19 Density Packing vs Kernel 14 6 26 -2 **21 19 31 13** 3 26 -28 Kernel Feret Ratio- 2 -3 19 -2 20 15 7 2 20 7 7 -7 -24 16 Nut Vol wo Air-10 13 24 5 26 34 10 -2 20 15 -18 11 7 14 -3 Kernel Vol Ratio wo Air-16-22-11 **-34-57-60**-31 10 79 -2 4 -5 20 -5 **-12 15 12** Packing Vol Ratio wo Air- -5 -5 -8 16 -3 -16 1 5 -6 2 14 -2 Shell Vol Ratio wo Air-20 23 15 24 <mark>60 71</mark> 30 -89 -2 -2 -8 7 -16 32 6 Shell Texture Kernel Weight Ratio-Packing Tissue Blank Tip Shrivel **Plumpness** Kernel Fill Ease Of Removal Shell Color Minor Shrivel **Major Shrivel** Shell Integrity Shell Seal Shell Strength