

## Soil chemist helps solve potassium puzzle

DETROIT, Mich — Potassium is a basic nutrient essential for crop growth, yet its behavior in the soil has been unpredictable. Its effect on yield in the sandy soils of the Atlantic Coastal Plain has been particularly puzzling. In many cases plants grown on these soils fail to show a yield response to additions of fertilizer potassium.

Very little is known about the rate at which potassium reacts with soil particles (its kinetics), or the energy required for this reaction to occur (the thermodynamics involved). Both are important in determining the eventual fate of added K fertilizer. How fast this soluble K becomes bonded to the surface of clay minerals in the soil and the strength of this bond determine in large part how quickly the nutrient will be leached.

University of Delaware soil chemist Donald L. Sparks has been studying the kinetics and thermodynamics of potassium on several coastal plain soils.

One of the few scientists doing basic research on the subject, he was invited to present a paper on his work during recent meetings of the American Society of Agronomy, Crop Science Society of America and Soil

Science Society of America in Detroit, Michigan. He also summarized what is presently known about how this essential crop nutrient behaves in the soil.

Most researchers agree that soil potassium exists in four forms: water soluble, exchangeable, non-exchangeable and mineral. In solution form, K is either taken up by plant roots or leached. In its exchangeable form it is bonded (adsorbed) to the surface of soil particles.

In its non-exchangeable form, it is present in vermiculites and clay minerals. It also exists in mineral form in micas and feldspars.

Sparks' work has shown that the structure of clay minerals in the soil largely determines the rate at which K is leached. Potassium exchange for adsorption is rapid with kaolinite, while K reacts slowly with vermiculite.

Coastal plain soils are high in mica and vermiculite. This means that on them potassium adsorption occurs slowly. Fertilizer K thus remains in solution long enough so that if it isn't taken up by plants, it can be leached.

These findings run counter to the earlier research on which most theories about potassium fertilizer have

been based. That research dates back to the mid 1800's and was conducted on soil with a high kaolin content and thus a high adsorption rate.

Based on his research on Delaware coastal plain soils, Sparks suggested that the lack of crop response to applied K on many of these soils may be due to the release of mineral K through weathering of potassium-bearing feldspars like mica and vermiculite. Until now

breakdown of these minerals has been thought to be too slow for this form of K to be available to plants.

He said there is also evidence that the lack of response could be due to leaching of applied K into clayey subsoil horizons where it is available to plant roots, providing growing conditions are favorable.

Further research on the basic nature of potassium exchange in these soils may someday make it possible to

predict more accurately when farmers will get a yield response from fertilizer potassium.

### COMPLETE DISPERSAL SATURDAY, DECEMBER 20

At 11:00 A.M.

1 mile from Route 706 at Rush, Pa. Rush is 10 miles from Montrose or 17 miles from Wyalusing, Susquehanna Co. Arrows!

#### 64 REG. & GRADE HOLSTEINS

34 mature cows, 4 bred hfrs, 10 yearling hfrs, 15 started hfrs, 1 service bull. Majority of dairy to freshen yet this winter. Several fresh now. On DHIA test. The young cattle sired by a Son of the Elevation Bull.

Preg. examined and interstate charts

#### MACHINERY 4 IH Tractors

IH '706", wide front, gas, 2 pt tractor, IH '706" gas, Tricycle, 3 pt tractor; IH '656" Hydro, wide front, 3 pt gas tractor, IH '460" Tricycle, 2 pt, gas tractor; IH 2000 loader, Gehl '800" chopper with pickup head (looks new), IH 550 chopper, 2 row head, IH #37 baler & thrower, IH Rake, IH #56 4 row planter; IH PR 1 corn picker; IH 4 bottom, 2 pt plow, IH #480 Transport Disc, Gehl #250 manure spreader with hydraulic gate and tandem axle, Gehl 2 ton grinder/mixer, Gehl Hi-Throw Blower, 3 Gehl self unloading boxes and wagons, 2 Danco pipe bale wagons, running gear, NI 36' grain & bale elevator, NH #279 Haybine, Yellow Devil 500 gal fiberglass sprayer, tractor chains, welder, Rigid power pipe tool and dies, Quantity tools; Misc found on a farm \* Badger 16' silo unloader \* Patz Barn cleaner with 500-600 ft chain \* Lely trailer fertilizer spreader \* 3250 bu. steel grain bin

#### MILKING EQUIPMENT

Zero 1000 gal Tank w/2 compressors, Bou-Matic S S 2" pipeline, washer & 8 units and Bou-Matic Vacuum Pump, Thermostor heat-saver water heater, etc.

Terms- Cash or Good Check.

Lunch served

Owners

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### Close & Fresh Cow Dispersal

Located just off Rt. 15 on Canoe Camp Creek Rd., 2 miles from Mansfield, PA. Watch for auction arrows off Rt. 15.

#### THURSDAY, DECEMBER 18

12.30 Sharp

#### 75 High Grade Holsteins 75

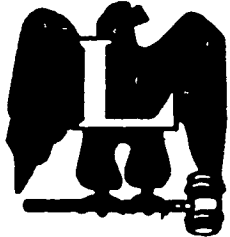
Most of these cows are fresh or will be fresh in the next 15 days. Interstate tested, shot for shipping fever. If you need fresh cows, be at this sale.

Terms: Cash or good check. Lunch Available. Sale under cover.

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### PUBLIC AUCTION

Outstanding 110 Acre Lanc. County Farm

Mt. Joy Twp.

Absolute Auction to be Sold to the Highest Bidder  
No Reserves, No Minimums

#### FRIDAY, DECEMBER 19

2 P.M.

Located along Sunny-Burn Road, Manheim, Pa., 7 miles Northwest of Manheim. Take Colebrook Road through Mastersonville. Continue North to Sunny-Burn Road. Watch for sale arrows.

#### 110 Acre Farm - All Tillable

In high state of cultivation. Thousands of feet of road frontage along 3 roads. Two 2 1/2 Story Dwellings, Large Frame Bank Barn.

2 1/2 story brick frame dwelling with large modern kitchen, formal dining room, large paneled den, large laundry, pantry or summer kitchen, 4 very large bedrooms & master bedroom, hardwood floors, closets, outside balcony, full bath, paneled basement, 2-car garage attached to house, oil hot water heat.

50'x85' frame bank barn with 2 barn floors & tobacco scaffolding. Situated to feed 85+ steers. 16'x52' Star silo with large stone wall barnyard. Other buildings include 30'x66' concrete block 4000 cage bird house with cooling & office room & outside feed bin. Frame tobacco stripping building.

2 1/2 story frame asbestos sided dwelling with 3 bedrooms, full bath, modern kitchen, living room & dining room, 1-car garage & storage area. Ideal for tenant house. Also, brick school house used for storage. To inspect Farm call 717-665-3248 or auction firm.

Sale by,

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717-665-3248

J David Young, Manheim, Attorney

Special Note: Terms 10% Down, balance by April 1, 1981.

70% Financing Available to Qualified Buyers. Speculator Buyers must arrange financing through auction firm 7 days prior to auction.

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The J Omar Landis Auction Service

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### HOLSTEIN DISPERSAL

The undersigned, due to loss of husband, will sell on the farm "Roc-Vue" located 4 1/2 miles northeast of Shippensburg, Cumberland, Co., Pa., or 4 miles southwest of Newville along Rte 533, leave Rte. 81 at Newville Exit or King St. Exit, on

#### TUESDAY, DECEMBER 16

Sale at 12.00 Noon

#### 65 GOOD GRADE HOLSTEINS

Tested within 30 days, Preg. checked. Herd consists of 38 cows, 4 fresh in Nov, 7 due in Dec, 7 in Jan, bal, various stage of lactation, cows have size, good udders and are good producers, 6 bred heifers, 2 due in Dec, 3 in Jan, 1 in March, 8 heifers from yearlings to breeding age, bal from few weeks to yearlings. Most of these cattle are A B S sired and carry same service inc Cappy, Mooktown Optimist, Starlite Rex, Fantastic, Thonyma Elevator, and others.

#### SEMEN TANK & FOLLOWING SEMEN SELLS

Marvex, ten straws, Mollie Chief, 5, Hbg Gay Ideal, 12, Will-Try Farms Legacy, 14, Optimist, 6, Tel-View Cleo Pawnee Cappy, 6, Kil Ivanhoe Jack, 6, Fantastic, 12, Flower Citation Coronet, 8, Marksman, 8, Sar-Ben Reflection Commander, 8, Skagvale Fasea Rocket, 8, Penn Dole Ivan Joe, 12, Knob Luck Kingpin, 12, Apollo Rocket, 12, W H Ivan Van, 12, Heiford, 4. Semen sells at 1 30 P M. Bring Tanks. A large sale of excellent farm equipment will be held Thurs, Feb 26, 1981.

Sale Managers Note — If you need good grade Holsteins don't miss this sale.

Terms Cash; Lunch at Sale, Sale in tent

Owner,

#### MRS. WARREN MERKEL

R D 5, Box 168 N,  
Shippensburg, Pa.

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Marion, Pa,  
Auctioneer and Sale Manager  
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### PUBLIC SALE

#### of Valuable Real Estate SATURDAY, FEBRUARY 7

@ 11 A.M.

180+ Acre Dairy Farm. Located along Rt. 419 in Tulpehocken Twp., Berks Co., Pa. 5 mi north of Rt 422 & Womelsdorf, 5 mi south of Rt 22 & Interstate 78 Rehrersburg exit.

#### REAL ESTATE

ZONING Rural, 1 acre lots. Thousands of feet of road frontage on 2 roads. Approx. 130 acres tillable in a high state of cultivation w/48 acres in young and excellent alfalfa, 13 acres fenced pasture, 37 acres mature woods w/2 never failing streams & pond. Silt loam soil, high fertility, high PH, moderately deep, well drained, level to gently sloping, base siltstone, impure limestone, grey and brown calcareous shale.

HOUSE 3000+ sq ft just completely & distinctly refurbished sub-structure to finish 1st flr - kit, din rm, den, liv rm, full bath & laundry. 2nd flr - 3 very large bdrms, vestibule, 2 full baths & closets. 3rd flr unfinished bdrm. Finished basement w/utility bath & game rm. Dynatherm oil hot water baseboard heat. All copper plumbing w/top line Kohler fixtures & water softener. Armstrong flrs & Lees & Milkin w/w carpet throughout, incl basement. Fully insulated, all storm windows & much more.

OUTBLDGS All outbllds freshly painted & in excellent repair. Bank Barn 45x90 Starline Stanchions for 30 cows, 2 lg heifer pens & barn cleaner. Milk house w/400 gal Mueller bulk tank, bunk feeder shed 63x33 w/3 silos attached, 20x30 Harvestore, 16x60 Star poured concrete, 14x50 H & H, all unloaders in excellent cond. 3 car garage, independent 200 AMP service, house, barn & shed each w/separate breaker panels & generator hookup. Exceptional water supply from 180 well.

Terms: 10% dn. day of sale, settlement on or before April 30, 1981. Inspection by appt. Call: HORNING FARM AGENCY, INC. 215-286-5183

Terms By,

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